THE GRIZZLY HUNT IN BRITISH COLUMBIA:

AN ECOFEMINIST EVALUATION OF ENVIRONMENTALISTS'

ATTITUDES TOWARD WOMEN IN RELATION TO

PRECAUTIONARY EVIDENTIARY REQUIREMENTS

By

Megan Jane Bulloch

B.A., University of British Columbia, 1994
B.A. (Hons.), Simon Fraser University, 1998

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

In the Department of Women's Studies

SIMON FRASER UNIVERSITY

SEPTEMBER 2003

Approval

Name: Megan Jane Bulloch

Degree: Master of Arts (Women's Studies)

Title of Thesis: The grizzly bear hunt in British Columbia: An ecofeminist evaluation of environmentalists' attitudes toward women in relation to precautionary evidentiary requirements

Examining Committee

Chair: Dr. Helen Leung
Assistant Professor, Department of Women's Studies
Simon Fraser University

Dr. Marilyn MacDonald
Senior Supervisor
Assistant Professor, Department of Women's Studies
Simon Fraser University

Dr. Meredith Kimball
Second Supervisor
Professor, Women's Studies and Psychology
Simon Fraser University

Dr. Alison Gill
External Supervisor
Professor, Department of Geography
Simon Fraser University

Date Approved: Sept 12, 2003

PARTIAL COPYRIGHT LICENCE

I hereby grant to Simon Fraser University the right to lend my thesis, project or extended essay (the title of which is shown below) to users of the Simon Fraser University Library, and to make partial or single copies only for such users or in response to a request from the library of any other university, or other educational institution, on its own behalf or for one of its users. I further agree that permission for multiple copying of this work for scholarly purposes may be granted by me or the Dean of Graduate Studies. It is understood that copying or publication of this work for financial gain shall not be allowed without my written permission.

Title of Thesis/Project/Extended Essay

The grizzly hunt in British Columbia: An ecofeminist evaluation of environmentalists' attitudes toward women in relation to precautionary evidentiary requirements

Author:

(signature)

Megan Jane Bullock

(name)

12 Sept 2003

(date)

Abstract

The grizzly hunt in British Columbia is an example of a case where the precautionary principle may be invoked. The precautionary principle is located within the New Environmental Paradigm. Based on these connections, this research uses the example of the grizzly hunt to investigate the relationship between environmentalist and feminist attitudes and the evidentiary requirements for precautionary behaviour. Drawing on ecofeminist theory, this research asks if a predisposition toward an environmentalist paradigm also predisposes one toward a feminist paradigm. Participants were 48 self-identified hunters, scientists and activists. The New Environmental Paradigm (NEP) scale and the Attitudes toward Women (AWS) scale were administered to participants to examine their attitudes toward the environment and women's rights. The participants scored highly on both scales, demonstrating positive attitudes toward both environmentalist and feminist issues. However, there was no relationship between responses to the two scales. To further test the association between environmentalism and feminism, scenarios concerning the grizzly hunt and the use of tamoxifen as a chemopreventative for breast cancer were presented to the participants. For each issue, participants were asked to rate four scenarios and choose which one would lead them to refrain from action, *i.e.*, invoke the precautionary principle. Scenarios varied by the certainty of evidence

presented (high or low) and the expertise of the source (high or low). Data collected from the grizzly bear hunt scenarios determined that participants favoured evidence from the low uncertainty/high expertise scenarios. When participants responded to scenarios concerned with the use of tamoxifen as a chemopreventative for breast cancer, they did not choose any one of the four scenarios more often than would be expected by chance. I concluded that individuals well versed in an environmental issue responded to this issue using expertise derived from their special relationship with this issue in contrast to feminist issues, where their responses were based on personal experience and general knowledge rather than their expertise. The relationship of this finding to the precautionary principle and role of paradigms in this process is discussed.

Dedication

For my Uncle Garry,

whose last words to me were,

"I think we need to talk more about that thesis of yours."

And to

Grinder and Coola

Cari and Boo

For being Grizzly Bears

Acknowledgements

I would first like to thank my participants, who taught me with their thoughtful and thought-provoking answers. Having not worked with human primates previously, I was uncertain what to expect from my fellow humans. I found an outpouring of information and help. Thank you.

Meredith Kimball and Marilyn MacDonald provided much important direction during this process, pruning the many-headed beast as I tried to integrate so many ideas. Thank you for your expertise and your guidance, both in a supervisory capacity and as academic feminist role models. Thanks also to Dr. Alison Gill for being the external examiner and for your thoughtful questions.

I thank my graduate cohort in Women's Studies, in particular Rachel Hurst and Baharak Yousefi for their support and friendship; my Dad, who provided sunny climes to rest my brain; my best friend Tracy Roberts, who saved my life and is my lucky charm; my Mom, who gave me perspective when tunnel vision hit; and finally, Pete who gave me the strength and support to start in the first place, held me together until I finished and pointed ahead to where my dream awaits, even smiling when I said, "Want to move to Ohio so I can work with chimps?"

Table of Contents

Approval ii
Abstract iii
Dedication v
Acknowledgements vi
Table of Contents vii
List of Tables ix
Chapter One Introduction 1
Defining environmentalist 2
The tool of ecofeminist theory 10
My proposed research 13
Paradigm of environmentalist 13
Environmentalists and Feminists 18
Evidentiary requirements 23
Chapter Two Methods 26
Participants 26
Materials 31
Scales 31
New Environmental Paradigm scale (NEP) 31
Attitudes Toward Women scale (AWS) 33
Questionnaire development 35
Procedures 38
Chapter Three Results 43
Scale data 43
New Environmental Paradigm scale 44
Attitudes toward Women scale 44
Correlation between scales 45
Survey data 45
Grizzly population survey questions 47
Methodological concerns 48
Worth of the bears 51
Ecological concerns 52
Other interesting responses 53
Results of grizzly bear scenario choices 54
Group differences 60
Tamoxifen survey questions 61
Mistrust of pharmaceuticals and drug testing 63
Trust of science 64

Trust of Health Canada 65
Personal choice and experience 65
Results of tamoxifen scenario choices 67
Impact on society 71
Chapter Four Discussion 73
Being an environmentalist 73
Paradigms: Environmentalists and Feminists 76
Scale data 76
Survey data 81
Precaution and role of evidence 86
The precautionary principle 86
Paradigms and precaution 88
Contextual values 90
Strengths and limitations of the study 94
Personal reflections 98
Appendix A Ethics Approval 102
Appendix B Questionnaire 103
Appendix C Initial Email 116
Appendix D Cover letter 117
Appendix E Information Document 118
Appendix F Information Document for Ministry Employees 119
Appendix G The grizzly hunt in British Columbia 121
List of References 124

List of Tables

Table 1 Responses by Group 28
Table 2 Demographic information on annual income level 29
Table 3 Mean rating responses for Grizzly Scenarios 55
Table 4 Responses to grizzly bear scenario question by sex 56
Table 5 Responses to grizzly bear scenario question by age 56
Table 6 Responses to grizzly bear scenario question by group 57
Table 7 Mean ratings of the Tamoxifen scenarios 67
Table 8 Results of Tamoxifen scenario question by sex 68
Table 9 Results of Tamoxifen scenario question by age 68
Table 10 Results of Tamoxifen scenario question by group 69

Chapter One Introduction

In some ways, the question underlying my Master's research began in Ghana, West Africa, where I was researching black and white colobus monkeys in a small monkey sanctuary. It ends in Vancouver, studying the unique ways that ecofeminist theory can explain the grizzly bear hunt controversy of 2001 in British Columbia. The uncertainty of scientific evidence and different evaluations of bear population data resulted in the polarization of interest groups. Those calling for a full moratorium on bear hunting were at one extreme and those wanting the hunt to continue at the other (See Appendix G for more information on the status of the grizzly bear and the hunt controversy). This demonstrates the different ways the precautionary principle can be invoked with respect to the grizzly hunt. Although seemingly unrelated, these topics are both aspects of my personal journey toward a better understanding of the complexities of being and becoming an environmentalist.

Defining environmentalist

I met my first non-human primate at the Calgary Zoo in 1998, just after finishing my honours psychology degree. My experience of primates up until that point had consisted only of discussions within an evolutionary psychology course. Kakinga, the silverback of the lowland gorilla group, and I sat on either side of the glass for half an hour, staring at each other. I mark that experience, seeing curiosity in another great ape's eyes, as the beginning of my interest in great ape cognition. That was the moment when I decided that the best way to protect non-human primates, both in captivity and the wild and their relation to their natural surroundings, was to understand them and then teach others.

At the time, I thought that what was needed to convince people to protect the gorillas was more scientific information, both about their psychological and physical needs and about the provision of their surroundings – surroundings usually called *natural* or *wild* – as sufficiently complex to facilitate their full development as individuals and societies. I was becoming an environmentalist in the current understanding of the term.

The Oxford English Dictionary (1989) defines an *environmentalist* as, "One who believes in or promotes the principles or precepts of environmentalism; also, one who is concerned with the preservation of the environment (from pollution, etc.)." When common usage of the term is searched through Project Muse from

Johns Hopkins University, the activist aspect of an environmentalist comes to the fore. These definitions and usages reflect the popular understanding of the term. This popular understanding appears to emphasize the activist component of *environmentalist* particularly in a role of protecting the environment. As time went by, I had narrowed my definition of *environmentalist* to only include individuals who went to great lengths to protect the environment, such as those who blockaded Clayoquot Sound in the early 1990s to protect the old growth forest from logging.

The common definition, then, of *environmentalist* includes the recognition that animals' habitats must be protected as well as the animals themselves. To fail to do so is to fail to protect the animals, as the role of their surroundings plays an integral role in their development as individuals.

This relates as well to levels of protection. Protection can be understood as a passive "do no harm" protection, as well as an active "try to save" protection. The passive aspect of protection suggests that we must refrain from harming the environment, fulfilling a moral minimum of environmental protection. The active aspect of protection suggests that we must take a benevolent role in saving the environment, going above a minimal, passive position and performing a supererogatory duty toward the environment.

The moral minimum of taking precaution certainly seems to be the level to which humanity strives, particularly given the conceptualisation of environmental protection in Article 15 of the United Nations Conference on Environment and Development in 1992. Article 15 was written as follows:

> In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation. (UNCED, 1993)

If common sense suggests damage to the environment is occurring, place environmental protection first, rather than waiting until causal relationships have been established by scientific evidence. While international communities considered such strongly worded statements of environmental protection, great ape populations were being threatened by hunting and habitat destruction. Although there were conferences and meetings, the risk to primates of extirpation and extinction through both human actions and inaction continued. I saw the culprit as humans' wilful ignorance to the plight of other primates rather than recognizing the complex issues that lie at the heart of environmental protection. Indeed, this suggests that we have set the bar well below a more costly requirement to actively protect the environment; such a supererogatory duty would fit more closely with a feminist requirement for care and nurturance.

It was not until I was doing research in Ghana that I fully realised the ambiguities involved in balancing environmental protection and human welfare. Land for farming, fresh water and firewood were always scarce and always needed at the nearby villages of Boabeng and Fiema. Individuals survived by farming small lots around the village. They hiked several kilometres to their plots each morning at sunrise, machetes in hand, babies tied to the women's backs, followed by small children who carried gasoline cans on their heads. The primary crop I saw was yam. This food staple was supplemented with snakes found in the fields, chickens and hogs that ran free in the sanctuary and fruit from the trees around the area.

In the middle of the subsistence farms around Boabeng and Fiema sat the lush monkey sanctuary, with fresh water, plenty of firewood and the added bonus of semi-habituated monkeys for food. Initially, the expectations of the local villagers were such that they supported the sanctuary, believing they would benefit financially from the tourists who visited the site, allowing them to move away from subsistence farming. However, the tourists who made the dusty journey to the sanctuary bought nothing from the villages – indeed rarely entered Boabeng or Fiema. Rather than bringing jobs and revenue to the villages, the establishment of the sanctuary took away resources from the villagers. Protection of the monkeys and their habitat had made the villagers worse off

than before with less land and no derived benefits from the tourists. The cost of environmental protection for these villagers in Boabeng and Fiema was their health and lives.

Through our focus on the colobus monkeys, the research team from the University of Calgary demonstrated that individuals could be environmentalists but not recognize or act on other social justice issues. The other researchers and I entered the site thinking of the villagers as impediments to our study of the monkeys. We groaned when a group of school children shouting *"Abruni"*, which means, "White foreigner", congregated around us, scaring the monkeys up higher into the canopy. We were frustrated when the borehole in the village broke. The villagers had to trek through the sanctuary to gather water at the stream, calling out, *"Etisene"* or "How are you?" as they passed us, equally enthusiastic each time, while we, hot, tired and dusty, could barely manage to nod in response. The villagers were a source of constant frustration in our desire to study and protect the monkeys. Although it struck me that this was not the way to deal with people, I could not see past the destruction of the land and the extirpation of these species to the tragedies and struggles of the local people.

For all that I was there to learn more about the monkeys in order to protect them, the villagers knew the environment of the sanctuary more intimately than any researcher at our site ever would. We might know the scientific names of the

trees, their diameter at breast height, canopy cover and location on a hand-plotted map, but the villagers knew the medicinal importance of the leaves, food value of the fruit, uses of the bark and wood and how to find the trees in the dark when they had a stomach ache. It was their home and they were far more aware of and lived closer to their environment than we ever would.

These images stayed with me when I returned home. I questioned what being an environmentalist really meant. "Save the monkeys, there are too many people" was too simple. Dealing with real life conservation questions where the survival of humans butted against the threat of extirpation of these monkey species revealed the naiveté of my stance. There was more to being an environmentalist than wanting to save monkeys.

My difficulties in Ghana reminded me of an equally perplexing experience on a trip to Alberta to visit my favourite uncle. I had arrived at the farm after dinner, rushing from a primatology conference in Calgary. To my dismay, my uncle and cousin stood beside a freshly killed moose carcass. My desire to take advantage of a rare opportunity to spend time with my family won out over my anger and sorrow at what I saw as the senseless killing of the moose.

I learned little that night about skinning a moose. What I learned about bonding relationships, shared experiences and the connectedness of people altered my views about hunters. Over the gutted carcass of a dead moose, there

was a camaraderie I had never imagined; these men talked about their relationships, their jobs, their kids and their dreams. I no longer looked on the act solely as a violent murder of a helpless animal, but also as a social rite of passage for some people and way for them to nurture social relationships and strengthen friendship bonds. I discovered that my opinion of hunters was as naïve as my view of environmentalists.

These experiences, combined with my own personal struggles to match my real world actions to my environmental beliefs, kept me rethinking how humans interact with the environment. Reflecting on my actions as a researcher in Ghana and on the relationship the hunters in Alberta and villagers in Boabeng and Fiema had with their environment, I realised that acting as an environmentalist was not so simple. I looked on my Uncle Garry as an environmentalist, knowing and loving the land and the wildlife through his environmental expertise gained through his personal experience with the dynamics of nature. But how could I integrate this with the fact that he was a hunter? How could I consider my own lifestyle, living in downtown Vancouver, driving a Jeep, eating food imported from around the world, environmentalist? Stanley Park was the closest I had been to anything remotely wild in a very long time.

In thinking about the complexity of defining "environmentalist", I realized that the roots of my definition lay in direct personal awareness of and interaction with the environment. With this awareness should also come the added realization of what is at risk when the environment is destroyed or degraded. That I was beginning to see that my Uncle Garry and the villagers in Boabeng and Fiema were also environmentalists caused me to rethink the narrow stereotype of environmentalist I held and to view the issues in their complexity rather than attempting to understand them in strict terms of right and wrong.

I realized also that my own identification as an environmentalist had been context-specific. I was an environmentalist in some situations but not in others. For example, I chose to be a vegetarian for environmental and animal rights reasons but then, rather than eating in-season local produce and supporting local organic farmers, I ate vegetables and fruits grown tens of thousands of kilometres away, on large plantations that used pesticides, exploited local workers and created more pollution due to transport needs. As I confronted my stereotype of environmentalist, I sought a new way of understanding the meaning of environmentalist. I began broadly, including anyone with an interest in, love for and experience with the natural environment. Within a definition of environmentalist there must be recognition of the intricate intertwining of

humanity's place in the natural world. One personal aspect of this research is my on-going redefinition of what it means to be an environmentalist.

The tool of ecofeminist theory

While I was studying in Calgary, I read *Primate Visions* by Donna Haraway (1989), in which one of my professors – Linda Fedigan – was discussed for her feminist contributions to primatology. That is, Haraway argued that Fedigan brought to primatology answers to both of what Harding (1986) proposed as the key questions of feminist science studies. These are the women question in science and the science question in feminism. The women question in science addresses what is to be done about women's status in science. Fedigan was among the first generation of female primatologists who performed field studies and brought a female perspective to fieldwork and the questions we ask in primatology. The science question in feminism asks can something so deeply connected to patriarchal masculinist and imperialist paradigms as science be safely and effectively used for liberation. Every step of the scientific method from observations to conclusions is biased by gender standpoints and different questions, evidence and conclusions were made possible when women began asking questions. Fedigan was one of these women in primatology.

However, what I did not see in Haraway's (1989) argument was a real sense of environmentalist understanding. Although she addressed the role of

women primatologists in changing the discipline, she failed to argue for the protection of their subject matter – the non-human primates – both in terms of being primates and for their surroundings. This led me beyond feminist science studies to ecofeminist theorists and their conceptualization of relations between feminism and the environment (Merchant, 1980; Griffin, 1989; Gaard, 1993; Mies and Shiva, 1993; Mellor, 1997; Sturgeon, 1997; Warren, 1997; Warren, 2000). I consider ecofeminist theory to offer a unique tool to investigate these issues. In looking at the link between mindsets of domination, it sets up a unique approach within feminism, dealing substantively with issues of science and the moral consequences of different epistemologies.

Connections between the unequal status of women and destruction of nature are made in many areas. Ecofeminist theorists conceive connections between women and nature in many different ways. Two ways are common to many ecofeminists and are most relevant to the questions I am asking in this research. The first is that the authority that justifies sexism will also sanction anti-environmentalism (Gaard, 1993). The second concept is that in understanding environmental oppressions, we enhance our ability to fully understand women's oppressions. Through the examination of one oppressive context, we are better able to understand other oppressions (Sturgeon, 1997). Warren (1987) suggests that by demonstrating the interconnections between

sexism and anti-environmentalism and by understanding how these oppressions act, we are better able to understand other oppressions like racism and classism.

My position within ecofeminism draws on the supposition that, given a connection between women and the environment, the understanding of an underlying oppressive conceptual framework is necessary to better understand any oppression (Warren, 1987). The oppressions of women and the environment are justified by similar conceptual frameworks, constructed from beliefs, values, attitudes and assumptions that shape how the individual interacts with the world and views her/himself (Warren, 1990). These frameworks are influenced by gender, race, class, age, sexual orientation, nationality, religious background and ability.

Warren (1990) identifies three defining features of an oppressive conceptual framework. These are; (1) valuing hierarchical thinking, (2) valuing dualisms, and (3) using the logic of domination. These three concepts are closely linked. Although an argument may be made that dualisms are not necessarily dangerous in themselves, when a logic of domination is applied to them they become oppressions. A logic of domination is such that one looks at the differences between two things, viewing one as less valuable than the other. Because of inherent characteristics, it is deemed less valuable and therefore, less

deserving of protection or privileges, be they wealth, safety, health care or tracts of undisturbed wilderness.

My proposed research

This personal journey – from dismay over the protection of monkeys in Ghana to astonishment at the lack of precaution taken with the grizzly bear in British Columbia, through governmental policy, precautionary action and ecofeminist theory – has lead to two primary questions I am interested in exploring. First, are those individuals who are positively predisposed to the environment, environmentalists, also supportive of feminist issues? Second, do environmentalists differ in their evidentiary standards for precaution? A subset of this question includes whether there is a difference between evidentiary standards for precaution in environmentalist issues and feminist issues, women's health for example. This question addresses humans' ability to engage in rational decision-making and some of the influences on this process.

Paradigm of environmentalist

In order to answer these questions, I sought a way to identify an individual predisposed to environmental awareness. Would individuals such as my Uncle Garry and myself score similarly on a measure of environmental concern? Although I considered us both environmentalists, I wanted to find a way to test this assumption. I found such a method in the New Environmental

Paradigm (NEP) (Buttel, 1987; Catton and Dunlap, 1978; Dunlap and Van Liere, 1978; Catton and Dunlap, 1980; Freudenburg and Gramlin, 1989; Gramlin and Freudenburg, 1996; Dunlap et al., 2000). In this research, I am defining paradigm as "A set of assumptions, concepts, values and practices that constitutes a way of viewing reality for the community that shares them" (*http://dictionary.reference.com/search?=paradigm*). This definition goes beyond Kuhn's (1962) focus on the scientific community and the role of a paradigm to guide normal science. This common definition encompasses the idea of a community of individuals, rather than scientists, sharing a common mindset. Further, the impact of assumptions, concepts, values and practices on how one views reality explained the reasoning behind how different interest groups concerned with the grizzly bear hunt could come to different conclusions using the same evidence.

Catton and Dunlap (Catton and Dunlap, 1978, Dunlap and Van Liere, 1978, Catton and Dunlap, 1980, Dunlap et al., 2000) suggested that a paradigm existed which they called the Dominant Social Paradigm (DSP). This paradigm sought to minimize risk to humans by controlling various factors, particularly the environment, through science and technology. Four points are central to the DSP (Catton and Dunlap, 1978, Dunlap and Van Liere, 1978, Catton and Dunlap, 1980, Dunlap et al., 2000). These are; (1) humans are different from and have

dominion over other animals, (2) humans are the masters of our fates, having the ability to do what is necessary to meet goals, (3) humans have unlimited opportunities on this vast world, and (4) progress is key in the history of humankind, where solutions can be found for every sort of problem.

This paradigm can be related to the position of those supporting the grizzly bear hunt in British Columbia in the following ways. First, given that humans have dominion over other animals, humans have the "right" to do what we will with bears and the environment. The environment is ours to control and dominate. Secondly, because we are in control of our own fates, we can set goals, which may be to accumulate monetary wealth and put plans into place to allow this to happen. Regarding the grizzly hunt, then, it is the right of individuals to choose to hunt and to choose to make money guiding other individuals to hunt. Given our domination over nature and the third principle, of unlimited opportunities, we can use the environment to meet these goals, trusting that there will always be grizzlies to hunt. The final principle, that scientific and technological progress will solve any problem, gives humankind peace of mind when there are fewer grizzlies to shoot or the wilderness is gone. Science and technology will find a way to create more grizzlies or more wilderness for hunters to continue hunting and money to be made.

In contrast to the DSP some communities of individuals share a mindset that the environment needs protection. This was called the New Environmental Paradigm (Catton and Dunlap, 1978, Dunlap and Van Liere, 1978, Catton and Dunlap, 1980, Dunlap et al., 2000). Three key concepts within this paradigm include; (1) humans are one species among many in the biotic communities, (2) cause and effect and feedback among these biotic communities and species produce unintended consequences from human action, and (3) given that the world is finite, economic and cultural growth are constrained by physical and biological limits. This paradigm locates humans within the greater ecosystem rather than having dominion over it. There is a greater risk, then, to humans as we cannot control the ecosystems with our science and technology and hence, are at greater risk ourselves.

Applying this to the grizzly hunt, because individuals are part of the larger ecosystem, we do not have the right to exploit other species for our own monetary gain. Further, because we are limited in our knowledge of causal relationships between other species, we are unable to control the effects of our actions. Hunting grizzlies may result in unintended and unforeseen circumstances. Given that the world is finite, we are not able to exploit the environment for our own gains without ramifications. Such ramifications in this example may take the form of extirpation of populations of bears or extinction of

the whole species. The further consequences of this result are unknown and equally uncontrollable.

Dunlap and Van Liere (1978) developed the New Environmental Paradigm scale to test where an individual was located on a continuum of values relating at the low end of the scores to the Dominant Social Paradigm and at the high end to the New Environmental Paradigm. An individual could then be located firmly within or on the peripheries of either paradigm.

This scale consists of three subscales. These include human impact on the balance of nature, limits to growth for human society and humanity's dominion over nature (Dunlap et al., 2000). A positive response to a question from the NEP scale such as "When humans interfere with nature it often produces disastrous consequences" or a negative response to a question such as "The balance of nature is strong enough to cope with the impacts of modern industrial nations" would indicate a pro-NEP response on the first subscale.

On the second subscale, that there are limits to growth, a positive response to a question such as "The earth is like a spaceship with very limited room and resources" or a negative response to a question such as "The earth has plenty of natural resources if we just learn how to develop them" would indicate a pro-NEP response.

Finally, a positive response to a question such as "Humans were meant to rule over the rest of nature" or a negative response to a question such as "Humans have the right to modify the natural environment to suit their needs" would indicate a pro-NEP stance regarding the third subscale concerned with humanity's dominion over nature. Opposite answers to these questions would indicate pro-DSP stances.

Environmentalists and Feminists

I administered the NEP scale to a group of participants who fit my working definition of an environmentalist as someone with an interest in the environment to discern how firmly these individuals fell within the New Environmental Paradigm or Dominant Social Paradigm. The group I chose to target as participants are those individuals who had experience supporting or condemning the grizzly hunt and population data as hunters, scientists or activists.

The first task then is to determine if individuals who are environmentalists are also feminists. Few researchers (Somma & Tolleson-Rinehart, 1997; Wang, 1999; Smith, 2001) have tested the relationship between women and nature empirically. Those that have found mixed results concerning sex and the strength of this relationship. Using different measurement instruments on different populations, Somma and Tolleson-Rinehart (1997), Wang (1999) and

Smith (2001) found a significant relationship between feminism and environmentalism in both women and men. These results support the common ecofeminist theory that feminism and environmentalism are linked in individuals' minds.

These studies found different results concerning sex differences in the relationship between these attitudes (Somma & Tolleson-Rinehart, 1997; Wang, 1999; Smith, 2001). Both Somma and Tolleson-Rinehart (1997) and Smith (2001) did not find an overall difference between females and males in the relationship between feminism and environmentalism. Wang (1999) found sex differences in the strength of the relationship between attitudes toward women and the environment. The correlation between the scales was stronger in females (r=.56) than males (r=.24). Additionally, Smith (2001) found significant interactions between gender and specific environmental concerns when feminism was controlled for. Women who reported being feminist also reported concern over pollution and environmental regulation at levels greater than or equal to men (Smith, 2001). These results support a qualification of the relationship demonstrated in Wang (1999): women who identify as feminists are more likely to be concerned about specific environmental issues that relate to human use of the environment than men. The difference between the findings of Wang (1999) and Smith (2001) may be due to the level of analysis performed. Wang (1999)

analysed his data at the scale level, while Smith (2001) analysed his data to the subscale level.

Another explanation for the differences among these results may be found in the different methods used in these three studies. Somma and Tolleson-Rinehart (1997) used specific questions relating to feminism and environmentalism from surveys previously administered to large, random, international populations. Examples of questions used to assess feminism in this study include whether individuals pay attention to women's issues or believe that working mothers have as good a relationship with their offspring as stay at home mothers. Examples of questions used to assess environmentalism include whether participants buy environmentally friendly products or approve of the anti-nuclear movement (Somma and Tolleson-Rinehart, 1997). In contrast, both Wang (1999) and Smith (2001) administered scales to college students in the United States specifically designed to measure attitudes toward women and the environment. These scales may be more effective at determining the complex relationships between sex, feminism and environmentalism than the questions used by Somma and Tolleson-Rinehart (1997).

It may also be that the differences in samples *e.g.*, college-aged students in contrast to a random population, led to a difference in results. As a more homogeneous population, the college students may have a less variable world

view that groups liberal attitudes together; whereas the random sample from the large international populations with arguably different life experiences may have a wider and more complex worldview that leads to a lower correlation of attitudes across a series of liberal issues.

In order to discern if individuals who are environmentalists were also concerned with feminism, I administered a scale that determined attitudes toward women's rights. From the many scales that measure attitudes toward women (Fassinger, 1994; Glick and Fiske, 1997; King and King, 1997; McHugh and Frieze, 1997; Spence and Hahn, 1997; Masser and Abrams, 1999), I chose the Attitudes toward Women Scale (AWS), to assess whether individuals hold positive or negative attitudes toward women. A positive correlation between attitudes toward the environment as measured by the NEP scale and attitudes toward women as measured by the AWS scale would demonstrate that individuals who are firmly within the New Environmental Paradigm also hold positive attitudes toward a feminist paradigm. The reverse, a negative correlation between the two scales, would indicate that one could be firmly within the New Environmental Paradigm and firmly anti-feminist and anti-women's rights. A non-significant correlation would demonstrate that one could be firmly within the New Environmental Paradigm and be anti-feminist, ambivalent towards feminism or strongly feminist. A non-significant correlation

means that there is no relationship between the two scales; one score cannot be predicted from the other.

The AWS scale taps into a paradigm similarly to the NEP scale. In this case, however, the paradigm is one of positive attitudes toward women or, with a low score, negative attitudes. Some essential assumptions, concepts, values and practices that are shared by a community of individuals with positive attitudes toward women include such factors as gender equity before the law, in education and the workplace, political parity, control over reproductive rights and medical treatment, freedom from violence and discrimination and freedom of sexual expression. An individual who holds positive attitudes toward women, then, believes that women should be given the same treatment and opportunities as men. An individual who scores highly on the AWS scale would reject attempts to define and treat women as less than individuals or rely solely on our reproductive abilities to define our "place" in society.

The AWS scale assesses participants' beliefs about gender equity in the workplace and in education through positive responses to questions such as, "Women should assume their rightful place in business and all the professions along with men", and negative responses to questions such as, "Sons in a family should be given more encouragement to go to college than daughters." Questions concerned with equal partnerships include positive answers to

questions such as, "A woman should be as free as a man to propose marriage," and negative responses to questions such as, "Women should worry less about their rights and more about becoming good wives and mothers."

Evidentiary requirements

The second question this research addresses is the evidentiary requirements of environmentalists to invoke precautionary behaviour. My participants completed additional questions concerned with the grizzly bear population data. Participants were asked to indicate whether they would or would not support the hunt and their reasons for this decision. They were then asked what evidence they would find most convincing to stop hunting from a choice of four scenarios that vary by uncertainty of evidence and expertise of source. Participants were also asked to elaborate on the reasons why they found their choice most convincing of the need for precautionary action. These data provided information concerning what evidence individuals required to act with caution.

The second aspect of this second question investigated whether environmentalists have different evidentiary standards on issues that are not related to the environment but rather to a feminist issue. In this case, I used the issue of women's health to look at a feminist paradigm. This second question determined how individuals in an environmental paradigm dealt with an issue in

a feminist paradigm. The debate over the invocation of the precautionary principle regarding the use of tamoxifen as a chemopreventative for breast cancer demonstrates the need for the precautionary principle as a tool in health issues as well. The demonstrated dangers of tamoxifen, the lack of long term data, the criticisms of the methodology and the aggressive marketing by pharmaceutical companies are implicated as areas of concern in the use of tamoxifen as a chemopreventative for breast cancer in high risk women (Batt et al., 2001; BCA, 2003). I was interested in determining what evidence individuals find most convincing to encourage precautionary behaviour, using the scenario of tamoxifen as a chemopreventative to explore what evidence individuals in an environmentalist paradigm require to invoke the precautionary principle relating to a feminist issue.

Using the same format as the grizzly bear hunt scenario, participants were first asked if they would support the use of tamoxifen as a chemopreventative in individuals at high risk of breast cancer and their reasons why. Next, they were presented with four scenarios concerned with evidentiary choices dealing with tamoxifen as a chemopreventative and the factors that influenced their choice of scenario. I compared the answers to the grizzly population scenario to those from the tamoxifen scenario. As the participants had been selected according to their knowledge and interest in the grizzly population scenario – their role as

environmentalists – they were considered well versed in this area. In contrast, there was nothing to suggest that these individuals were also experts in the tamoxifen issue. I compared what evidence was used to invoke the precautionary principle between the two scenarios to determine if different evidence was considered when evaluating caution around an issue that one could be considered an expert in and one that one was not.

Chapter Two Methods

Participants

Recruitment of participants was based on purposeful sampling (Maxwell, 1996). This method of sampling allows for the deliberate selection of certain participants due to their ability to provide an important perspective or information that is unavailable from other sources. I selected three groups to participate in my study because my research focused primarily on whether individuals who support environmental rights will also support women's rights and how one's paradigmatic view will affect one's choice of evidence for precautionary behaviour. These targeted groups were: (1) individual hunters and guide outfitters; (2) bear and wildlife biologists who make decisions and do research concerning bears and hunting practices; and (3) activists involved with groups either directly protesting the bear hunt in B.C. or interested in the protection of wilderness areas and environmental educators. This sample was neither exhaustive nor representative of all groups. Individuals had to fulfill one

of these criteria to be eligible to participate in the study. Some individuals were in more than one group. Given that I had selected participants due to specific criteria and non-random sampling, results from this study provided a window into what specific groups involved with the hunt were thinking about these issues, rather than a base from which one might generalize about hunters, scientists or activists or the application of the precautionary principle in other situations.

A list of potential participants was accumulated during the proposal process and throughout the study. Email addresses or phone numbers for these contacts were then found on the Internet or provided by other participants. The hunters included in my data collection tended not to be part of an organization and hence, were identified individually. This group was gathered through word of mouth and private contacts. I obtained contacts for biologists through the Ministry of Water, Land and Air Protection directories, Ministry contacts, university websites, and wildlife and conservation organizations. I compiled a list of environmental organisations that were specifically interested in wildlife, bears and land trusts from the British Columbia Environmental Network website. Following these initial contacts, individuals in some organizations such as Greenpeace and the Ministry of Water, Land and Air Protection provided me

with names and contact information for possible participants. All email addresses and phone numbers were in the public domain.

I approached 128 individuals to participate in this study. Of those, 69 (54 percent) replied positively. These 69 individuals were sent questionnaires and 48 (70 percent) returned completed questionnaires. The overall response rate was 38 percent. Numbers of returned questionnaires did not differ significantly between groups (Table 1) (X^2=3.875 < 9.21, df = 2, p= .01).

Group/Procedural stage	Initial Contact	Positive contacts	Completed surveys
Hunters	26	17	11
Scientists	47	20	15
Activists	55	32	22
Totals	128	69	48

Table 1 Responses by Group

Of the 48 surveys returned, women completed 16 surveys (33 percent) and men 32 surveys (66 percent). Of the 16 females who completed surveys, two (12.5 percent) were hunters, four (25 percent) were scientists and 10 (62.5 percent) were activists. Of the 32 males who completed surveys, nine (30 percent) were hunters, 11 (33 percent) were scientists and 12 (37 percent) were activists. Only the environmentalist group has close to equal numbers of female and male participants (10 females and 12 males).

In 40 of the 48 returned questionnaires, the participant classified her/himself as "Caucasian" (this category included answers such as "white" and "European Canadian"). In two cases, the participant marked her ethnicity as

"Chinese". In two cases, the participants used the terms "multicultural" or "human". There were four participants that left this question blank.

There were a wide variety of ages in participants. Two participants were under 24 years of age. The majority (34 participants) fell between ages 25 and 54. Twelve participants were over 55 years of age. The mean age of the participants was 42 years of age.

Participants were asked about their level of education. One participant reported having some high school. Two individuals had completed high school. Three participants had some university or college. Four individuals had trade school or a technical school certificate. Twelve individuals had university degrees. Eight individuals had some graduate school. Eighteen individuals had a graduate degree.

Participants were also asked about their annual income levels. There was a range of income levels reported. These data are presented in Table 2.

Income level	$10,000 to $20,000	$20,001 to $30,000	$30,001 to $40,000	$40,001 to $50,000	$50,001 to $60,000	$60,001 to $70,000	$70,001 to $80,000	$80,001 to $90,000	Over $90,001
Participant number	6	6	10	3	5	2	5	2	6

Table 2 Demographic information on annual income level

Participants were asked how frequently they attended a house of worship. Two individuals indicated that they attended a house of worship while 39 said that they never attended a house of worship. Two individuals reported that they

attended infrequently. Three individuals wrote other answers including nature, own home and forest.

When asked about their political stance, 14 individuals characterized themselves as left. Fifteen individuals reported that they were liberal and five reported that they were conservative. Six individuals circled other but only one elaborated on this, writing "libertarian" in the space provided. When asked about political party affiliations, 28 reported that they did not have a party affiliation. Four individuals wrote Green party, one wrote Liberal, two wrote NDP and one wrote Alliance. One individual each wrote conservationist, ecofeminist and democrat.

Participants were asked about their current residential environment. Fourteen reported living in a rural area. Six reported living in a semi-rural area. Twenty-seven reported living in an urban area. When asked about the environment they had grown up in, 10 reported that this had been a rural environment, 16 that it had been a semi-rural environment and 21 reported growing up in an urban environment.

Participants were asked to indicate how many forms of activism they participated in. Four checked no forms of activism. Seven individuals checked one, six checked two and four checked three. Thirteen participants indicated that they performed four acts of activism. Seven individuals engaged in five different

types of activism. Four participants participated in six types of activism and only one individual participated in seven types of activism.

Materials

A copy of my ethics approval is found in Appendix A. A copy of the questionnaire is found in Appendix B. The questionnaire consisted of two scales, questions about two scenarios and demographic questions. Questionnaires were photocopied and assembled so that the survey was stapled together and the information document (Appendix E) rested on top of it. This was done to make it easier for the participants to take the information document away with them. In half the questionnaires, the Attitudes toward Women (AWS) scale appears first and in half, the New Environmental Paradigm (NEP) scale appears first. This was done to minimize response effects of one scale on the other.

Scales

New Environmental Paradigm scale (NEP)

The New Environmental Paradigm scale (NEP) is a general measure of attitude toward the environment, designed to measure a worldview that conceptualises how society and the environment interact. The NEP scale was designed to measure three beliefs: (1) natural resources are limited, (2) humans and the environment are in an interdependent relationship and human actions

can have grave effects, and (3) nature is devalued if "progress" is defined as acquisition of property (Dunlap, et al., 2000).

Dunlap and colleagues (2000) recently revised the scale to include more issues within an environmental worldview, to balance pro and anti NEP sentiments and to avoid dated terminology, while retaining high reliability and validity. Grendstad (1999) found a coefficient alpha level for the revised version of .72, lower than the coefficient alpha reported by Dunlap and his colleagues (2000) of .83.

Regarding validity claims, Dunlap and his colleagues (2000) found that the revised NEP scale had criterion validity, content validity and construct validity. In the original study the findings that environmentalists scored higher on the NEP Scale than the general public was taken as known-group validity (Dunlap and Van Liere, 1978). Research on the NEP and environmental behavioural intentions, self-reported behaviours and observed behaviours demonstrated predictive validity (Dunlap et al., 2000). Criterion validity was demonstrated from these findings as known-group and predictive validity are subsets of criterion validity. Based on a positive correlation with education (r = .10), political liberalism (r = .32) and past residence in an urban setting (r = .08) and negative correlations with age (r = -.11) and income (r = -.10), the authors suggested that the scale had construct validity (Dunlap et al., 2000). Dunlap and

his colleagues (2000) found that respondents who endorsed the NEP scale were more likely to support pro-environmental policies (r = .57), perceive the seriousness of air and water pollution (r = .45) and report more pro-environmental behaviours (r = .31) (Dunlap et al., 2000). These finding supported the claim of construct validity. The claim of content validity was supported by the similarity of findings for three classifications of environmental beliefs between the NEP scale and an ethnographic interview study (Kempton et al, 1995 in Dunlap et al., 2000).

Although there is some argument about the uni-dimensionality of the scale (Grendstad, 1999; La Trobe and Acott, 2000; Lalonde and Jackson, 2002), Dunlap and colleagues (2000) found that the correlations among the 15 items in the NEP Scale range from .33 to .62. This evidence, coupled with a coefficient alpha of .83, indicates that the scale can be treated as measuring one factor. Further, through principal-components analysis, 31.3% of the total variance was explained with a single factor (Dunlap et al., 2000). Given this evidence and the use of this scale as a single measurement by previous researchers (Wang, 1999), I assumed it was reasonable to use it as a single factor scale in this study.

Attitudes Toward Women scale (AWS)

The AWS scale measures attitudes toward gender-roles. This scale evaluates responsibilities, privileges and behaviours that fall in gender spheres

that have been assigned to one gender but could be viewed as responsibilities, privileges and behaviours that are not gender specific (i.e., attending university, swearing, career choice). This scale does not tap into attitudes about gender specific cognitive abilities, personality characteristics or the women's movement (Spence and Helmreich, 1972; Spence et al., 1973; Spence and Hahn, 1997). Similarly to the NEP scale, I used the 15-item scale, scored on a five point Likert scale. This scale has been used with both four-point and five-point response scales. The five-point scale has been most frequently employed and provides for a wider range of scores (Spence and Hahn, 1997). The AWS scale is a popularly used scale, measuring gender role attitudes in over 300 studies since 1978 (Spence and Hahn, 1997; Swim and Cohen, 1997). A higher score indicates a more positive view toward women and women's rights. Cronbach's alphas fall in the .80s, indicating uni-dimensionality, (r = .81 for women and r =.84 for men) (Spence and Hahn, 1997).

Regarding validity, Spence and Hahn (1997) found that females scored higher than males and females from a 1992 cohort score higher (are more egalitarian) than females from a 1972 cohort. These findings suggested that the scale has predictive validity. There is some discussion that the scale may have ceiling effects in some populations (i.e., college students) (Spence and Hahn, 1997); however, given the variety of participants I have recruited and the use of

the five point scale, I did not think that this will be a problem in my data. Further, in choosing this scale, I recognised the value in my use of two scales that were similarly oriented *i.e.*, a pro-woman scale and a pro-environment scale. Another advantage is that by using the NEP and ATW scales I can compare my results to Wang's (1999), who also used these scales.

Questionnaire development

In addition to these two scales, the participants were given a 19-question questionnaire, which consisted of three parts: (1) questions about the grizzly bear population data, (2) questions about the use of tamoxifen as a chemopreventative, and (3) a choice between two potentially detrimental scenarios involving government cutbacks, one concerning environmentalist issues and the other regarding feminist issues. I chose to include these additional questions in order to understand what evidence individuals would find convincing enough to invoke precautionary behaviour. In addition, I compared an issue about which participants are well versed with one about which participants were less likely to be knowledgeable.

In the first section, a scenario concerning grizzly bear population data and limited entry hunting was presented. Participants were asked if, based on this scenario, they would support the government's decision to allow limited entry hunting and what factors were important in their decision. On the next page,

participants were presented with four additional scenarios concerning the methods/data from the first scenario. These four scenarios varied by providing either low uncertainty or high uncertainty evidence and by including sources with either high or low scientific expertise. Participants were asked to rate how convincing each scenario was on a scale of one to five. They were asked to choose the scenario that they found represented the most convincing argument to support a ban on the grizzly bear hunt. Participants were then asked to elaborate on the reasons why they found their choice the most convincing.

In this section, the low uncertainty conditions were scenarios C and D (Appendix B). In both, population data was presented as highly certain. In scenario C, the environmental group (low expertise) was convinced that the government had overestimated the population enough for the viability of the population to be called into question and in scenario D, the biologist (high expertise) was confident of the new (lower) population information, based on new methods. In the high uncertainty conditions (scenarios A and B; Appendix B), the population data was presented as uncertain. In scenario A, an individual (low expertise) has not seen bears in three years and in scenario B, the biologist (high expertise) reported that the government's method overestimates the population, but was unclear about the size of overestimation. Participants were asked to make a choice concerning how convinced they were by ambiguous

evidence presented by an expert or non-expert source or unequivocal evidence presented by an expert or non-expert source for the need for precautionary behaviour. Space was provided for participants to elaborate on what evidence they used to make these decisions.

In the second section, participants were presented with a scenario concerning the testing and use of tamoxifen as a chemopreventative. They were asked, based on this information, to choose whether or not they supported the use of this medication in the prevention of breast cancer and what factors would be important to them in making that decision. On the next page, participants were provided with four scenarios designed to invoke uncertainty about the use of tamoxifen. These scenarios varied by providing either low uncertainty (scenario A and B, Appendix B) or high uncertainty (scenario C and D, Appendix B) of evidence and by including sources with either high (scenario A and C, Appendix B) or low scientific expertise (scenario B and D, Appendix B). They were asked to rate these four scenarios according to how convinced they were by them and then to choose the scenario providing the best evidence against the use of tamoxifen as a chemopreventative and describe why they made this choice. Responses to this question were compared with the grizzly question to ascertain whether evidentiary requirements for precaution differed between an environmentalist issue and a feminist one.

In the third section, participants were provided with two scenarios. The first one described detrimental effects of government cut backs concerning environmental issues *i.e.,* cutbacks to wildlife officers. The second one described cutbacks concerning women's issues *i.e.,* cutbacks to women's centres. They rated how detrimental they felt each was to society on a five-point Likert scale and then chose which they felt was most detrimental to society: the environmental cutbacks, the women's centre cutbacks or both (see Appendix B).

A section to collect demographic information was included at the end of the questionnaire. This information included age, sex, ethnicity, education level, annual income, political affiliation, residential environment (current and previous), volunteer work and sources of information for environmental and health issues.

Procedures

When participants were contacted through email, an email briefly summarizing the content of the questionnaire and the purpose of the study was sent to potential participants, inviting them to participate in this research (Appendix C). When initial contact was made through a phone call, I briefly summarized the content of the questionnaire and the purpose of the study before asking potential participants if they wished to participate.

If a positive reply was received from the individual by email or on the phone and the individual was outside of the Lower Mainland or the Victoria area, a survey package was mailed to the individual. The following is the procedure for mail packages.

Once an email reply or positive phone response was received indicating interest in the study, an email was sent or verbal reply made indicating that a survey package was in the mail. The survey package included a cover letter (Appendix D), the Information document that further explained their rights as participants (Appendix E for non-government employees and F for government employees), the survey (Appendix B), a stamped return envelope addressed to the investigator, and a blank envelope with a note indicating that the participant could self-address the blank envelope and return it with their survey to obtain a summary of the results.

Surveys were marked with an "H", "S" or "E" on the back, indicating whether the recipient was placed into the "hunter", "scientist" or "activist" groups for later data analysis. Given that I wanted to include a broad range of individuals who were experienced with the issue of the bear hunt in British Columbia, I chose three groups that were vocal in the media on the issue and represented three main opinions on the hunt. To determine whether these individuals scored similarly or differently on the scales and in their open-ended

responses concerning evidentiary requirements, I made note of the group, hunter, scientist or activist, from which I had solicited their participation in the study. No other marks were made on the study for identification purposes.

Individuals were not asked to self-identify which group they belonged to on the questionnaires. Some of the biologists identified themselves to me in their emails as hunters or activists as well. I had expected overlap between scientists, hunters and activists to some extent. Two of the people sent a questionnaire marked E had post-graduate work in a field related to biology, ecology or wildlife management. Because scientific education was potentially important to how individuals responded, these participants were classified as scientists for the analysis of results. All the people originally recruited as scientists remained in the scientists category based on the education criterion. The hunters were recruited primarily through word of mouth and personal contacts. I asked each if she/he had been hunting and based on that response they were placed in the hunting category. All individuals recruited as hunters responded that they had been hunting and therefore, remained in the hunting category.

Most mailed questionnaires went to only one person. In two instances several questionnaires were sent to one person in an organization who indicated there were several people interested in participating. Even when a general email

was sent or call was made to a group or organization, a questionnaire was not sent out until I had been in personal contact with at least one individual.

If an email reply was received by an individual or group in the Lower Mainland or the Victoria area, I attempted to set up a time to meet with the participant(s) and administer the survey in person. However, because of the difficulties of scheduling in-person administration of the survey, only a minority of Lower Mainland and Victoria participants completed the survey in person. The rest received mailed questionnaires. Five hunters and one biologists completed in-person surveys. In the case of one group of six activists, I attended their monthly meeting to introduce myself and distribute the surveys. They took the survey away and returned completed surveys by mail.

When the administration of the survey was conducted in person, this took place in private or semi-private areas, usually offices, meeting rooms or private homes. Individuals were given a brief summary of the study and asked to read through the Information document (Appendix E and F) fully. They were then asked if they had any questions. Following this, the investigator left the room until the participants had completed the surveys (Appendix B). In one case, this took as long as an hour; however most people completed it in approximately 20 minutes. The surveys and envelopes were collected and participants were given the opportunity to ask questions about the survey and to discuss their opinions

and feelings about the topics. I recorded the themes of these conversations in my field journal.

Upon receipt of the returned questionnaires, self-addressed envelopes were separated from the questionnaires and placed in a safe location in my home. Questionnaires were assigned a number (e.g., E001) for the purpose of data analysis.

Chapter Three Results

Scale data

Forty-eight surveys were received. Occasionally these surveys were missing data. When one or two answers were missing from each scale, responses on that question were averaged across the participants' remaining responses and used within that scale. This happened in five cases across the two scales. One participant did not answer the AWS scale and one participant did not answer the NEP scale. Their answers on the other scale were included in data concerned solely with the one scale; however, they were not included in comparisons or correlations between the scales.

I conducted t-tests to determine if the order in which the NEP and AWS scales were presented influenced participants' scores on the scales. For both the AWS ($P(t=-1.217, 45) = .230$) and the NEP ($P(t=0.102, 45) = .919$), there were no differences between participants who filled out the scale first and those who

filled it out second. Because these order effects were not significant, I have combined the groups for the remainder of the analysis.

New Environmental Paradigm scale

The overall mean for the NEP scores was 63.22 (*SD*: 8.42, *n=47*). There was no significant difference between the means of females (*M=65.33, SD=7.63, n=16*) and males (*M=62.13, SD=8.72, n=31*), *P(t=-1.242, 45)* = .221. There was not a significant difference between the means by ages, broken into over forty and forty and younger categories (over 40: *M=63.04, SD*= 9.93, *n=23*; 40 and younger: *M=63.38, SD=8.72, n=24*), *P(t=.138, 45)* = .891. Using a one-way ANOVA, there was not a significant difference among group means on the NEP scale (Hunters: *M*=58.50, *SD*=11.60, *n*= 11; Scientists: *M*= 62.92, *SD=5.81, n=14*; Activists: *M=65.76, SD*=7.21, *n=22*), *F*(2, 44) = 2.972, p=.062. In this sample, the NEP scale had a coefficient alpha of .7917 (*n*=47, 15 items).

Attitudes toward Women scale

The overall mean for the AWS scores was 66.86 (*SD*=5.42, *n*=47). A t-test demonstrated there was no significant difference between the means of females (*M=68.16, SD=5.6, n*=16) and males (*M=66.2, SD=5.31, n=31*), *P(t=-1.176, 45)* = .246. Nor was there a significant difference between the means by age, broken into two categories: forty years of age and younger and over forty years of age (over 40: *M=67.76, SD*= 4.59, *n=23*; under 40: *M=66.06, SD=6.10, n=24*), *P(t=-1.10, 45)* = .273.

Using a one way ANOVA, there was not a significant difference between group means (Hunters: *M*=63.66, *SD*=5.95, *n*=10; Scientists: *M*= 66.94, *SD*=5.57, *n*=15; Activists: *M*=68.26, *SD*=4.66, *n*=22), *F*(2, 44) = 2.640, p=.083. In this sample, the AWS scale had a coefficient alpha of .6170 (*n*=47, 15 items)

Correlation between scales

A two-tailed Pearson's *r* correlation between the means of the AWS and NEP scales was *r* = .189. This score was not statistically significant (p=.209, n=46 two-tailed). The correlation between the means of the AWS and NEP scales was not significant when tested for females (*r*=.156, p=.563, n=16, two-tailed), or for males (*r*=.172, p=.364, n=30, two-tailed).

Survey data

This section includes data relating to the grizzly population and the tamoxifen chemoprevention scenarios. The first section consists of data drawn from the surveys relating to the grizzly population data questions. The second section contains the results from the surveys relating to the tamoxifen chemoprevention scenarios.

I arrived at themes in the open-ended survey questions using manual analysis rather than specialized software programmes. Throughout the collection of questionnaires, I transcribed qualitative data into a Word document, organised by participant identification number (i.e., E048). I read through this

document numerous times during transcribing. I made note of topics that were repeated by different participants. Themes were similar responses given by more than five participants, or ten percent of the sample. I assigned these themes a colour and went through the Word document, highlighting similar responses with the same colour. Using this document as a guide, I copied and pasted comments from the original transcription into separate documents for each theme, including miscellaneous topics, defined as those responses made by fewer than five participants. Following this process, I went back over the theme documents and reviewed the participants' responses to determine that they were, in fact, relevant and related to that theme. In doing so, I found that some of the themes were better represented when combined, others were clearer when separated. For example, initially, intrinsic and extrinsic worth and value of the bears were different themes. In my final analysis these are combined as one theme entitled worth of the bears.

Because responses were coded by theme and not participant, a number of participants discussed several themes within her/his answer. These responses were reported using general quantitative indicators, *e.g.*, more than half, less than a quarter rather than the exact numbers of participants or the exact percentages of participants who reported a particular theme. I chose not to report exact percentages as I had not performed interrater reliability testing on my qualitative

data and did not want to confer on these percentages the sort of weight borne by exact numbers, particularly given the small number of participants in this study, the non-random selection of a specialized population and the reliance on one rater. Therefore, the themes were presented as examples of ways of thinking about environmental and health issues rather than a representative survey of the frequency of various ways of thinking.

Grizzly population survey questions

Following the brief description of the grizzly population data scenario, the first question in the survey was "Would you support the government's decision to allow Limited Entry Hunting? What factors were important in making your decision?" (Appendix B). Participants chose either yes or no, that they did or did not support hunting. This question provided baseline data concerning where participants stood regarding the grizzly hunt issue. It also provided information concerned with what evidentiary factors the participants used to make their decision.

Thirty-three (70 percent) participants reported that they did not support the government's decision to allow Limited Entry Hunting. Fourteen (30 percent) indicated that they supported Limited Entry Hunting. One participant did not respond. Among the female participants, two (12.5 percent) supported hunting and 14 (87.5 percent) did not. Of the male participants, 12 (39 percent)

supported hunting and 19 (61 percent) did not. This difference was not statistically significant (X^2 = 3.3 < 3.84, *df*= 1, p=.05). Of the hunters, nine (92 percent) supported the hunt, while 2 (8 percent) did not. Among the scientists, five (34 percent) supported the hunt and ten (67 percent) did not. All 21 of the activists (100 percent) did not support the hunt. Using a Chi-square, these differences were statistically significant (X^2 = 23.07 > 13.82, *df*= 2, p=.001)[1]. Of those forty years of age and younger, seven (29 percent) did support hunting and 17 (71 percent) did not. Of those older than forty years of age, seven (30 percent) supported hunting and 16 (70 percent) did not. This difference was not statistically significant (X^2 = .007 < 3.84, *df*= 1, p=.05).

Participants were then asked to elaborate on their above answers. Three primary themes emerged from the participants' responses. These themes included; (1) methodological concerns, (2) worth of bears, and (3) ecological concerns. An additional section with interesting responses from less than five participants each is included after the discussion of the main themes.

Methodological concerns

This theme relates to the participants' discussion of the government

---

[1] Siegel and Castellan (1988) suggest that a Chi square should not be used if more than 20 percent of the expected frequencies are less than five. In this test, two (33 percent) expected values fell below five (4.5 and 3.3). However, Howell (1997) suggests that, in such a case, a more likely problem is low power rather than inflated Type I errors. He cites Bradley et al. (1979) who found that in total samples as small as 20, the actual percentage of Type I errors rarely exceeded .06. Given that this statistic was significant to at least the p=.001 level, I have chosen to include this Chi square statistic.

biologists' estimated population numbers and the methods used to arrive at the population estimate. Responses that were grouped within this theme included those that expressed either confidence or a lack thereof in the government biologists, numbers or methods. Responses that expressed concern over wildlife management in general or how the potential kill numbers were arrived at were included in this category. Concerns about the government's population data and lack of confidence in the government's methods were the most common responses and accounted for over two thirds of the responses. In particular, some participants wrote that they did not trust the government's methodology, their results or the biologists in the government doing the study. One participant suggested a political reason for his mistrust, writing, "Government biologists are understaffed and under funded for research. Right now they are afraid for their jobs" (Participant E027).

Participants who wrote that they had previous knowledge of the methods the government biologists used to estimate the bear population thought that other methodologies were equally valid, but were not employed by the Ministry. Unfortunately, these participants did not elaborate on what these other methods were. Approximately half of the participants addressed concerns about the scientific basis of the method used to estimate the population. One participant wrote:

> We do not have a very good sense of what the confidence limits are for our estimate and they are probably wider than they should be to permit hunting. In the absence of accurate inventory data for grizzlies, I support the precautionary approach, i.e., no hunting. (Participant S014)

Less than 25 percent of the participants questioned the locations where grizzly bears were being hunted and counted. They questioned whether the counts were taking place on populations that were solid and if the counts were being done on populations that the government knew were healthy. Further comments related to the population estimate as a snapshot, rather than as a long term, complex, dynamic number that required intensive monitoring over long time periods. One individual referenced the history of wildlife management for his lack of support for the hunt, "I don't believe animals should be 'managed' and history shows that due to flaws in population estimates they are usually 'mismanaged'" (Participant E008).

Conversely, approximately a third of the participants supported the government's numbers, methodology and biologists. One participant lauded the government biologists and the review by the Ministry of Water, Land and Air Protection's (MWLAP) independent panel of bear biologists, "I trust the biologists who work for the B.C. Government. They have been reviewed by a panel of scientists, who found their work exemplary" (Participant H043). Generally, comments relating to this theme focused on the public's trust of the

government's numbers and the belief that the bear population supported a limited harvest.

Worth of the bears

This theme included statements that related to extrinsic worth of the bears, that is, their value for reasons related to other factors such as trophies or to draw ecotourists. Comments concerned with the economic gains from the hunt and from not hunting were included in this category. Personal emotive statements regarding feelings for the bears were also classified under this theme.

Over half of the participants shared the sentiment that "Trophy hunting is wrong" (Participant H001). The use of the dead bear – as a trophy rather than for food – was brought up by approximately a quarter of the participants. One participant likened the grizzly hunt to the harp seal hunt:

> Grizzly hunting reminds me of the issue with harp seals and killing pups for their skins which was a large controversy when I was growing up. I thought then that if we hadn't got past the stage of killing young animals for fur, it was probably high time that we did! (Participant S014)

Perhaps the best summary of this theme was from Participant E040, "I love grizzly bears and I don't think they ought to be shot."

Approximately ten percent of participants who brought up economic gains wrote that wildlife viewing or wilderness tourism had greater economic benefits than hunting. Along this same idea, one individual wrote, "The

economic gains from hunting bears would not justify the costs of managing them properly, including conducting appropriately detailed inventories" (Participant S014). On a more cynical note, another participant remarked, "Even the formula proposed above [in the questionnaire] might not satisfy groups such as hunters' organizations and businesses that need hunters to operate – like guides and tour operators" (Participant E041).

Ecological concerns

This theme included discussion about the role of the bears in their environment and the role of humans in managing the populations. Concerns about sustainability of the populations and habitat destruction were included within this theme. Approximately a third of the participants were concerned about the distribution of the bears and ecological significance of the bears in their natural habitat. A quarter of the participants referred to historical levels of bear populations in contrast to the current population levels. A tenth remarked on grizzly bear population trends, such as a natural rate of increase in a stable population, the distribution of the populations and the importance of consideration of these concepts within current population estimates and as other important factors threatening the bears. In general, participants were apprehensive that these questions needed to be addressed before the hunt took place. One participant wrote, "Habitat loss and human encroachment threaten

grizzlies more than harvest" (S005). Another identified other factors impacting on the bears in the wild, "Without information about bear habitat (ex. [sic] loss of habitat), other predators (gull [sic] bladder hunters) etc. an informed decision is impossible" (E041).

Other interesting responses

Responses in this section were not categorized as themes due to their use by fewer than five participants, but provided additional, interesting insights.

One interesting point is the use of hunting as an important tool to control bear populations. One participant wrote, "LEH [Limited entry hunting] permits good control of the number of animals harvested per year" (Participant H003). This sentiment was echoed in fewer than ten percent of the other responses. These participants provided information that every LEH permit sold did not equal one grizzly bear dead, explaining that the hunting success rates were lower than the permits sold and therefore, the numbers of LEH permits sold was a conservative number. In contrast, another participant wrote, "Small number of licenses issued is strangely suggestive of a hunt, not required to keep the population down, but to facilitate hunters" (Participant E035).

Two individuals brought up their personal experiences with bears in the wild as evidence that the bear population is sound. One commented that the population was healthy and that what mattered was what "I have seen

personally, what my friends have seen personally and what my guide outfitters see personally" (Participant H006). Another individual wrote, "My impression in traveling in the woods, there are more bears and problem bears than twenty years ago. Read Bear Attacks and Bear Attacks II [sic]" (Participant H018). This last sentence referred to a series of books that have analysed the triggers for bear-attacks (Shelton, 2001). Shelton (2001) argued that two such triggers were the lack of hunting to control bear populations and the reintroduction of bears by governmental organizations into new areas.

Results of grizzly bear scenario choices

Four scenarios were presented to the participants in question two of the grizzly population scenario. The purpose of the scenario choices was to provide information concerning what evidence these participants used to invoke the precautionary principle in relation to the grizzly hunt. These scenarios varied by degree of uncertainty of evidence (high or low) and expertise of source (high or low level of scientific expertise). I will be referring to the scenario choices for both the grizzly hunt questions and the tamoxifen questions by their classification as high or low uncertainty and high or low scientific expertise rather than by Scenario A, B, C or D. I have chosen to do this for ease of presentation given that the letter names of the scenarios do not correspond to the same variable conditions or to the order of presentation of the scenarios in the

questionnaire. Scenarios were not presented in the same order in order to minimize response effects. Thus, scenarios in both the grizzly hunt section and tamoxifen section will be presented as high uncertainty/high expertise, high uncertainty/low expertise, low uncertainty/high expertise, low uncertainty/low expertise.

Participants were asked to rate each of the four scenarios on a five point Likert scale. There was a significant difference among the means of the four grizzly scenarios (Table 3) *F(repeated measures)*(3, 135) = 5.922, 3.95>*Fcrit*>3.88, p=.01.

	High uncertainty/high expertise	High uncertainty/low expertise	Low uncertainty/high expertise	Low uncertainty/low expertise
Mean rating responses	3.14	2.68	3.78	2.08

Table 3 Mean rating responses for Grizzly Scenarios

When asked to choose the one scenario that they found most convincing, eight (18 percent) were most convinced by the high uncertainty/high expertise scenario. Two (five percent) of the participants reported being the most convinced by the high uncertainty/low expertise scenario. Thirty-four (77 percent) participants chose the low uncertainty/high expertise scenario. No participants chose the low uncertainty/low expertise scenario. Four participants did not answer this question. Using a Chi-square goodness-of-fit, the difference

among choices of scenario was statistically significant ($X^2 = 67.3 > 16.27$, $df = 3$, p=.001).

Due to the low number of participants, I was unable to perform statistical tests on further breakdowns of the overall data into subcategories of gender, age and participant group. Therefore, the following breakdowns are descriptive rather than inferential. The data were first broken into the responses of females and males (Table 4). Both sexes' choice of scenario was distributed similarly to the overall choice with three quarters of both genders choosing the low uncertainty/high expertise scenario.

Sex	High uncertainty/high expertise	High uncertainty/low expertise	Low uncertainty/high expertise	Low uncertainty/low expertise
Females	3 (19%)	1 (6%)	12 (75%)	0
Males	5 (18%)	1 (4%)	22 (78%)	0

Table 4 Responses to grizzly bear scenario question by sex

Looking next at age, 90 percent of those 41 and older chose the low uncertainty/high expertise scenario when the groups were broken down by age (Table 5). The 40 and younger group generally followed the same distribution of scenario choices with 65 percent choosing the low uncertainty/high expertise scenario.

Age	High uncertainty high expertise	High uncertainty low expertise	Low uncertainty high expertise	Low uncertainty low expertise
40 and younger	6 (26%)	2 (9%)	15 (65%)	0
41 and older	2 (10%)	0	19 (90%)	0

Table 5 Responses to grizzly bear scenario question by age

Finally, I looked at the distribution of the answers to the scenarios by group (Table 6). Eighty percent of hunters, 86 percent of scientists, and 70 percent of activists endorsed the low uncertainty/high expertise scenario.

Group	High uncertainty/high expertise	High uncertainty/low expertise	Low uncertainty/high expertise	Low uncertainty/low expertise
Hunters	1 (10%)	1 (10%)	8 (80%)	0
Scientists	2 (14%)	0	12 (86%)	0
Activists	5 (25%)	1 (5%)	14 (70%)	0

Table 6 Responses to grizzly bear scenario question by group

Participants were then asked to elaborate on what evidence they considered in making their scenario choice. In the following section, I discuss common responses found by participants who chose the same scenario as the most convincing evidence against the bear hunt.

Of the eight participants who chose the high uncertainty/high expertise scenario, approximately three quarters reported that they would have liked more information or believed that there was no consensus on the population. Three participants felt that the low population estimate provided a safety cushion for the population.

The two participants who chose the high uncertainty/low expertise scenario reported that scientific research could be done to demonstrate the populations were high or low but that only "people who value where they live and their surroundings [could] provide sound knowledge" (Participant E020).

and their surroundings [could] provide sound knowledge" (Participant E020). This same individual concluded, "I believe one person's experiences should be valued as much as one person's scientific research."

Thirty-four (77 percent) participants chose the low uncertainty/high expertise source scenario as the one they found most convincing. In their explanations of their choices, participants endorsed aspects related to the value of scientific evidence. These responses related to the importance of scientific evidence, their trust of the scientist and the importance of objectivity.

Approximately two-thirds of the participants who selected the low uncertainty/high expertise scenario commented on the fact that they were suspicious of anecdotal evidence given its non-rigorous nature. One individual wrote, "At least the D scenario is using some kind of method, whether it is more accurate or not than the earlier method. This is not an anecdotal approach to the problem and is much more objective" (Participant S009). Others cited the importance of more accurate research methods and the importance of statistics. One individual wrote, "Better scientific evidence always trumps anecdotal evidence" (Participant E041).

Over three quarters of participants who chose the low uncertainty/high expertise condition wrote that they trusted a biologist or an expert more than they would someone with anecdotal evidence or a government employee. Over

half commented that the credibility of the biologist increased because she recognized the flaws in the previous method and was using another method. One participant wrote, "This gives credibility to his [sic] honesty... I respect someone who is willing to admit his/her mistake and willing to use new and better methods" (Participant E027). Another participant stated that "Science is fallible as a human endeavour. [This] shows a concerted effort to find the actual bear population and so seems to be involved in actual science and stewardship" (Participant E008).

The third common explanation of those who chose the low uncertainty/high expertise source as the scenario they found most convincing was the importance of objectivity. Because the biologist was working for the government and not a self-interested party, she was seen as more objective than the environmental groups or the local resident by approximately half the participants. One participant commented, "Because the environmental group is known to be against bear hunting and once again demanded that it cease, this is less convincing to me. That group will always say that" (Participant E041). Participant H002 suggested that Scenario D is more convincing because it is "not based on a specific 'self interest' group." One of the participants made an interesting connection between this scenario and the reputation the provincial Liberal government has for not caring about wildlife issues. Participant H003

wrote, "I fear that the provincial government has shown a great deal of disregard for the results of proper science (e.g. Alexandra Morton studies done in order to further corporate agendas of people/companies that have supported (donated to) the Liberal Government."

Group differences

Although there was overlap between responses according to group, some themes were brought up more frequently in one group than the others. For example, individuals in the hunter group tended to report that they trusted the government numbers, believed the experts and wanted the "best methods" of scientific evidence. These comments were occasionally accompanied by a caveat such as concern over the Liberal government's environmental record and the role of habitat loss in decreasing wildlife populations. Information concerning the reality of hunting (*i.e.,* the role of hunting in wildlife management and to generate funds for conservation) was also included.

Scientists all wrote about the importance of using evidence garnered from the best methods by the biologist. In this group, only two individuals of the 16 chose a scenario other than the low uncertainty/high status source scenario. These two individuals chose the high uncertainty/high status source. Some scientists further identified the issue as falling within a societal context rather than a conservation or wildlife issue.

Activists often reported that they needed more information about evidence and methods. They tended to voice other concerns regarding habitat degradation and human encroachment on habitat as other issues for bear populations. Although most activists commented on the quality of methods or status of scientist as most convincing, some also wrote that local anecdotal evidence was powerful and that all sources and evidence were equally important. No other groups wrote about the importance of non-scientific/non-expert sources.

Tamoxifen survey questions

The following section deals with the data collected from the qualitative questions concerning tamoxifen as a chemopreventative scenario in the survey data. Participants were initially provided with a brief description of the research concerning tamoxifen and then asked if they would support the use of tamoxifen as a chemopreventative for breast cancer in high-risk individuals. Twenty-one (47 percent) participants reported that they did not support the use of Tamoxifen as a chemopreventative. Twenty-four (53 percent) indicated that they did support the use of Tamoxifen as a chemopreventative. Three participants did not respond. Of the males, 12 (39 percent) did not support the use of the drug as a chemopreventative while 19 (61 percent) did. Of the females, nine (64 percent) did not support the use of the drug as a chemopreventative while five (36

percent) did support this use of the drug. This result was not statistically significant ($X^2 = 2.5 < 3.84$, $df = 1$, p=.05). Six (60 percent) of the hunters supported this use of the drug in contrast to four (40 percent) who did not. Of the scientists, 11 (73 percent) did support the use of tamoxifen as a chemopreventative while four (27 percent) did not. Of the activists, seven (35 percent) supported the use of tamoxifen as a chemopreventative while 13 (65 percent) did not support this use of the drug. This result was not significant ($X^2 = 5.4 < 5.99$, $df = 2$, p=.05). Of those forty years of age and younger, 10 (45 percent) did not support the use of tamoxifen and 12 (55 percent) did support the use of tamoxifen. Of those older than forty, 14 (61 percent) supported the use of tamoxifen as a chemopreventative, in contrast to nine (34 percent) who did not. This result was not statistically significant ($X^2 = 1.1 < 3.84$, $df = 1$, p=.05).

There were four recurring responses in the answers to the scenario, "Would you support the use of this medication for the prevention of breast cancer? What factors were important in making your decision?" These themes included; (1) mistrust of pharmaceutical testing and pharmaceuticals, (2) trust of scientific data, (3) trust of Health Canada, and (4) personal choice and experiences. These themes were coded in the same way as the grizzly population question responses. As with the grizzly population survey questions, these were

coded by theme rather than by individual thus, individuals may have expressed more than one theme in their answers.

Mistrust of pharmaceuticals and drug testing

Included within this theme were responses that expressed doubt, confusion or concern over the use of pharmaceuticals in general, the risks of pharmaceutical testing, the ability of testing to assess long-term risks of pharmaceutical use and a lack of faith in relying solely on scientific evidence for answers. Approximately half of participants who indicated they did not support use of tamoxifen articulated mistrust of pharmaceuticals and testing procedures in general. For example, one participant remarked, "There are numerous studies and drugs and their outcomes seem to differ. Sometimes good, then a year later it's found to cause something else" (Participant H002). Approximately 25 percent of individuals who did not support the use of tamoxifen wrote about their concerns about the study, suggesting that there were ambiguous results or that the study was flawed. Unfortunately, they did not elaborate on these points. One individual wrote, "Scientific evidence should be scrutinized not accepted on faith" (Participant E008). Approximately half of all participants wrote that their decision rested on knowing more details about the side effects of the drug, the efficacy rates and quantitative data on the rate of risk reduction.

A tenth referred to precautionary concepts concerning the above details. For example, one individual wrote, "Would want to know woman's chance of getting cancer (i.e., is it a given these women will get breast cancer) – if not, why harm oneself on a potentially hazardous drug? In general – I would use the precautionary principle" (Participant E020).

Trust of science

Included in this theme are participants who commented that they trusted science and that tamoxifen should be used as a chemopreventative for breast cancer. Approximately a tenth of participants echoed this theme. Some examples include, "Scientific data has been used in this study which appears to be fairly extensive" (H018) and "If independent and complete research proves that the drug will prevent breast cancer, or at least reduce the risk, then the medication should be used" (H023).

In some cases, the type of precaution seemed to be in doubt. For example, "All drugs have side effects. To understand how drugs work we must try them" (E021). One participant wrote, "Given the evidence of the study of the 13 thousand women, Health Canada has it bass-ackwards and has approved this drug for the wrong purpose" (Participant E039). Less than a tenth of the participants thought that Health Canada was being too precautious and should have approved tamoxifen as a chemopreventative. Due to the low number of

participants who were against the precautionary principle, I did not classify it as a theme and instead, included their responses under the theme of trust of scientific data.

Trust of Health Canada

This theme consisted of responses in which participants expressed their trust in Health Canada's ability to balance precautionary behaviour and effective health care for those in a high-risk category for developing breast cancer, or indeed, simply their trust in Health Canada. A quarter of participants trusted Health Canada's use of science. Approximately a quarter of individuals responded that they would wait until Health Canada had approved the drug for prevention purposes or that they needed to know Health Canada's reasons why the drug was not approved before they would consider using it. One individual wrote, "If I was in extreme risk of getting breast cancer then I think I might try it. ... Otherwise, I would need Heath Canada's approval" (Participant E019).

Personal choice and experience

Approximately a quarter of participants brought up the importance of women's choice and women's ability to make decisions about health care. I included responses that reflected a woman's right to choice and control over her own medical treatment and those that gave examples of personal experiences with breast cancer. Some referred to their personal experiences regarding breast

cancer or reluctance to use pharmaceuticals (like HRT). Participant S014 wrote about her personal experiences and the choices that were made:

> I have had several close friends in this high-risk category. One was probably saved by the use of an experimental drug; the other's life was probably prolonged by a willingness to pursue aggressive treatment options. I think, if like the first friend, you come from a family where almost everyone gets cancer, if you have been tested and carry BTCA1 or 2, you might be very wise to consider any available proactive treatment. For heaven sakes, some women have their breasts removed to avoid getting breast cancer! Surely if such a radical treatment option is available, Tamoxifen should be considered too.

These examples highlighted the importance of women's choice, provide a personal perspective on this issue, as well as some of the complexity of treatment and personal decisions.

Approximately a quarter of the individuals referred to their desire to do their own research before trusting what Health Canada had deemed as acceptable use of the drug. A few of these participants referred to alternative treatments for preventing breast cancer. One individual wrote, "Tamoxifen is a very strong drug and non-drug options are available for the majority of women concerned about breast cancer" (Participant E041). Some of the uneasiness expressed appeared to come from the use of a drug to prevent a disease, rather than to treat a disease. This attitude is apparent in the following comment by Participant E010, "A drug to prevent a disease is like putting the cart before the horse."

Results of tamoxifen scenario choices

I now turn to the scenarios relating to tamoxifen as a chemopreventative found in the survey. Four scenarios were presented concerning the use of tamoxifen as a chemopreventative. These scenarios – similar to the ones regarding the grizzly population data – varied in two ways, either by level of uncertainty (high or low) or by expertise of source (high or low). Participants were asked to rate each of these scenarios on a five point Likert scale (Table 7). There was not a significant difference between these means when participants were asked to rate how convinced they were by each, $F(repeated\ measures)(3, 129) = 1.75$, $3.07 > Fcrit > 3.04$, $p = .05$.

	High uncertainty/high expertise	High uncertainty/low expertise	Low uncertainty/high expertise	Low uncertainty/low expertise
Mean rating responses	3.35	2.87	3.32	2.97

Table 7 Mean ratings of the Tamoxifen scenarios

Participants were then asked to choose one scenario that they found the most convincing against drug use. The high uncertainty/ high expertise scenario was chosen by 13 (31 percent) participants. The high uncertainty/low expertise scenario was chosen by nine (21 percent) participants. The low uncertainty/high expertise scenario was selected by 14 (33 percent) of the participants. Finally, six (14 percent) of the participants were most convinced by the evidence in the low uncertainty/low expertise scenario. Six participants did not answer this question,

or circled more than one scenario. The difference among choices was not statistically significant ($X^2 = 3.9 < 7.82$, $df = 3$, p=.05). Interestingly, overall only 33 percent chose the low uncertainty/high expertise scenario compared to 77 percent for the grizzly bear scenario. The results for women and men were similarly distributed across the four choices (Table 8). Due to small numbers of participants, the differences between men and women, groups and ages could not be tested statistically.

Sex	High uncertainty/high expertise	High uncertainty/low expertise	Low uncertainty/high expertise	Low uncertainty/low expertise
Females	5 (33%)	2 (13%)	4 (27%)	4 (27%)
Males	8 (30%)	7 (26%)	10 (37%)	2 (7%)

Table 8 Results of Tamoxifen scenario question by sex

When scores are broken down by age (over 40 and under 40 categories), scores again are more evenly distributed (Table 9) than was found in the grizzly data question.

Age	High uncertainty/high expertise	High uncertainty/low expertise	Low uncertainty/high expertise	Low uncertainty/low expertise
40 and younger	5 (25%)	6 (30%)	6 (30%)	3 (15%)
41 and older	8 (36%)	3 (14%)	8 (36%)	3 (14%)

Table 9 Results of Tamoxifen scenario question by age

When broken into groups, four (50 percent) hunters chose the high uncertainty/low expertise scenario, while only one chose the low uncertainty/high expertise scenario. Eight of the scientists (53 percent) selected

the low uncertainty/high expertise scenario. Six of the activists (31.5 percent) were the only participants to select the low uncertainty/low expertise scenario (Table 10).

Group	High uncertainty/high expertise	High uncertainty/low expertise	Low uncertainty/high expertise	Low uncertainty/low expertise
Hunters	3 (37.5%)	4 (50%)	1 (12.5%)	0
Scientists	4 (27%)	3 (20%)	8 (53%)	0
Activists	6 (31.5%)	2 (11%)	5 (26%)	6 (31.5%)

Table 10 Results of Tamoxifen scenario question by group

As with the grizzly hunt scenario, participants were asked to elaborate on the evidence they used to make their scenario selection. The following section presents their common responses broken up by selection of scenario.

The thirteen individuals who chose the high uncertainty/high expertise scenario related their choice to the concern of the doctor and the lack of influence by special interest groups. Providing both sides of the argument was generally not seen as inducing scientific uncertainty, as I had intended, but more as being responsible. Participant S005 wrote, "This is a good doctor as many are marginal, out-dated, mercenaries of human health." Other participants wrote that the individual is in the best place to make a decision now that she has "discussed it with her doctor who gave her available studies about the drug's possible effects. At this point, the individual has the best evidence on which to base a personal decision" (Participant S013).

Nine of the participants selected the high uncertainty/low expertise scenario, writing that they did so because it was based in a person's experience rather than on statistical probability but also combined some scientific evidence. One participant wrote that, "People were actually involved in the process, not the doctors, the patients. Their words mean more to me than Health Canada's" (Participant H006). Many participants commented on the importance of using both anecdotal and scientific evidence and the need for balancing risks and different types of data.

Fourteen participants selected the low uncertainty/high expertise scenario. They shared a common concern about scientific evidence and objectivity. Some participants cited the scientific research behind the decision of Health Canada to issue a warning, commenting that it is more convincing than the anecdotal evidence, or the word of one doctor. A few referred to the fact that Health Canada would be operating in the interests of all women rather than special interest groups. Many referenced the objectivity of a large governmental organization in comparison to that of a single doctor or group. For example, one participant wrote, "Health Canada is an independent government body, which hopefully is at arm's length from the pharmaceutical industry. Also, their action (not approving drug) is precautionary" (Participant E026). Another individual echoed the precautionary nature of this scenario, writing, "Although Health

Canada quotes no research the position appears prudent and perhaps I trust that the national organization that oversees our health would base their decision on data and studies" (Participant E025).

Finally, the six participants who chose low uncertainty/low expertise scenario wrote that they felt that women's health networks would provide an early warning of any dangers. One individual cited the health issues surrounding silicone breast implants and the fact that they were considered safe until women became ill. Another wrote, "women's health networks provide good, sceptical information" (Participant E041). This same individual went on to write:

> I am easily swayed by authority and "science"....I think that science is a tool that we use to test our understanding of natural processes. But since human beings can never take in the totality of nature and reality, science can only help us if we use it carefully and place the precautionary principle first, in our own lives and in our work in the larger world.

Another individual wrote, "The women's health group is more focused on the issue and has access to research and anecdotal evidence " (Participant E027).

Impact on society

Participants were asked to choose the scenario they thought was most detrimental to society; cutbacks to government funding of wildlife services or cutbacks to government funding of women's centres, or both. Nine (19 percent)

participants selected cutbacks to wildlife related services as most detrimental. Twenty-five (53 percent) participants selected cutbacks to government funding of women's centres as most detrimental and 13 (28 percent) selected both as equally detrimental. This result was statistically significant ($X^2 = 8.9 > 7.38$, $df = 2$, p=.025).

Of those who chose A, that cutbacks to wildlife programmes were most detrimental to society, only one was a female. Eight were males. Four were 40 and younger and five were older than 40. When broken down by subgroups, five were hunters, three were scientists and one was an activist.

The second option was B, that cutbacks to women's centres were most detrimental to society. Eight women and 17 men chose this option. Fourteen of those 40 and younger chose this scenario, as did 11 of those over 40. Four hunters, nine scientists and 12 activists chose this option as well.

The third option presented to the participants was that both scenarios were equally detrimental to society. Seven women and six men chose this option. Four individuals 40 and younger chose this option, while nine participants over 40 selected it. Three hunters, three scientists and seven activists chose both scenarios as most detrimental to society.

Chapter Four Discussion

Being an environmentalist

I began this research questioning, among other things, my stereotype of an environmentalist. As a result of this research, my understanding of the term now encompasses far more than simply someone advocating for environmental protection. I now see an environmentalist as anyone who has an interest in, love for and experience with the natural environment. As I met with my participants, I was reminded that, although these individuals were divided into groups of hunters, scientists and activists for the purpose of this research, they were all environmentalists in this broader sense. I found that the hunters, contrary to so many stereotypes that portray hunters as ignorant murderers, were as concerned about the grizzly as the activists. The scientists, contrary to the stereotypes about them as government flunkies or out of touch with the wilds, were also environmentalists, balancing the good of the grizzly bear with the changing politics they work under. The activists were not blindly protecting the bears;

they were well informed and practical about the realities of the bears in the wild. When I at last analysed the data, it was interesting and rewarding for me to see the similarities between the groups.

Within this general picture of similarity, there were differences between the hunters, scientists and activists, particularly when they were asked in the first grizzly bear scenario whether they supported hunting of the bears or not. Hunters were far more likely to support the grizzly hunt than activists or scientists. Ninety-two percent of hunters supported the hunt. No activists supported the hunt. Although all of the participants in this study were involved with and interested in the grizzly bear issue, within their sub-groups the best approach for grizzly bear management differed. This result reminded me of my initial concern with the definition of environmentalist and the protean nature of the term in my experiences with primatologists, hunters and Ghanaian villagers. Although each group acted in the way that best meshed with their natural world, paradoxes between human needs and environmental needs arose within these interactions.

For the primatologists, it was the sacrifice of other humans for the protection of the monkeys and their environment. For the hunters, it was the sacrifice of a moose for the enhancement of their friendship bonds. For the Ghanaian villagers, it was the sacrifice of the monkeys and their immediate

environment for their survival. I saw this echoed in some of the participants in this study. One hundred percent of the activists were against the hunt and in doing so, in a sense, were sacrificing the guides and outfitters who make their living from this hunt. Most hunters supported the hunt, sacrificing individual bears for camaraderie and also, in their minds, the conservation of the species. It is not so simple to call this hierarchical thinking and logic of domination when some of the individual hunters claim that they are killing single animals for the conservation of the whole population.

Interestingly, many of the hunters made a point of telling me that they would never hunt a bear and that they did not understand why some individuals would. I thought this was remarkable that the hunters in my study were making an effort to distance themselves from grizzly bear hunters. A more detailed study of hunters of grizzly bears would be worthwhile for further research. Participants in this study made the distinction between hunters who used the animals they shot for food or those who hunted for trophies. Further research on this distinction would be interesting.

I administered the NEP scale to determine whether participants did, in fact, fall within an environmentalist paradigm. I found the mean of the NEP scale results was 63.22, indicating that individuals are locating themselves within the NEP paradigm. The highest score possible was 75. This suggests that

individuals who have an interest in and experience an environmental issue score highly on the NEP scale, a measure of attitudes toward the environment. Although there were some differences in the qualitative responses of the participants and their support or opposition to the hunt within different groups, there was no difference among their scores on the NEP scale. Hunters, scientists and activists all scored equally highly.

Paradigms: Environmentalists and Feminists

Scale data

I found that my population also scored highly on the AWS scale, a mean of 66.86 out of a possible 75. This result suggests that individuals also have positive attitudes toward women, locating them within a feminist paradigm. Although the participants held positive attitudes to both the environment and women, these attitudes were not related. This means that an individual's score on one scale cannot be predicted by her/his score on the other scale. A participant with a high score on the NEP scale was equally likely to have a low or high score on the AWS scale. This contradicts findings in other studies.

Previous research has demonstrated support for the relationship between attitudes toward the environment and women. Three studies have found that there is a significant correlation between feminism and environmentalism (Somma and Tolleson-Rinehart, 1997; Wang, 1999; Smith, 2001). In addition,

Wang (1999) found that females (r=.56, n=97) have a higher correlation than males (r= .24, n=60). One primary difference between my research and these three studies may explain the different results. Previous researchers have used general populations or college students. My participants were drawn from individuals involved with or interested in a very specific environmental issue, the grizzly hunt in British Columbia.

Given that my participants were experts in a specific environmental issue, holding strong opinions about the issue, I suggest that individuals with special experience with the issues that these two scales tap into would draw directly on their own expertise in those areas when responding to the scales. This population had expertise with the grizzly bear hunt issue, and, I would argue, had already made up their minds where they stand on this issue. As I have discovered doing this research, expertise and a strong opinion tend to complicate the issue. One gathers knowledge to inform one's opinion and, in doing so, comes across other points of view, other ideas and other ways of thinking about the same issue. An informed individual may also be more aware of the practical limitations of the scale questions. Such an individual would be aware of inconsistencies given that the scale is drawn from theoretical roots rather than practical applications.

Using a personal example from the AWS scale to illustrate this point, I would not answer the following question "Strongly disagree" as one might expect; "A woman should not expect to go to exactly the same places or to have quite the same freedom of action as a man." My reasoning is such that, although I think women should not be restricted in their movements, I also think there should be women only spaces and, by extension, men only spaces. There are, of course, many caveats to this line of thinking, *e.g.*, what happens in a women or men only space should not be detrimental to the other sex etc., but how do I quantify this qualification in a five point Likert scale?

I think that my participants faced a similar quandary when they answered the NEP scale questions. Due to their expertise on this environmental issue, they were aware of the complexity of the issue. This complexity cannot be captured in a 15-item scale. I argue that, although they scored positively on both scales, locating themselves within environmentalist and feminist paradigms, participants were treating environmentalist and feminist issues differently, drawing on general knowledge and personal experience for their AWS scale answers and on more complex and contextual knowledge from their expertise with the issue of the grizzly bear hunt for their answers on the NEP scale.

Additional support for the claim that participants were treating environmentalist and feminist paradigms differently comes from the coefficient

alpha for the scales. The coefficient alpha for the AWS scale was .617. The coefficient alpha for the NEP scale was .7917. The alpha level for the AWS scale is lower than what is reported in the literature (.81 for females and .84 for males, Spence and Hahn, 1997). The NEP scale is in the same range as is reported in the literature (.72 in Grendstad, 1999 and .83 in Dunlap et al., 2000). Participants in this study were more consistent in their answers of environmental attitudes than in their responses concerned with attitudes toward women. Although the responses to the AWS scale were not random, neither were they as consistent as responses to the NEP scale. This result suggests that participants in this study, who were more involved environmental issues, were less consistent when answering the AWS scale, perhaps because they were less involved or less informed about feminist issues.

An alternative, albeit tentative, explanation for the low alpha level on the AWS scale could be due to specific population factors. Given the range of individuals who participated in this study and the fact that the only unifying factor was their involvement in some way with the grizzly hunt, I wonder if the AWS scale is as internally consistent with an older, more specifically drawn population as it is with college-aged populations. Further testing of the AWS scale on non-college-aged populations would be an interesting follow up to this

finding and would provide data to better explain the low AWS alpha levels in this study.

In conclusion, I suggest that there was no relationship between scores on the NEP and AWS scales because my participants used expertise and well-grounded opinions to guide their answers on the environmentalist scale in contrast to personal experiences or general knowledge to guide their responses to the AWS scale. My findings contradict previous findings which, I argue, is due to the different characteristics of the populations. Other researchers have found a robust relationship between environmentalism and feminism in randomly drawn general, international populations and United States college students (Somma and Tolleson-Rinehart, 1997; Wang, 1999; Smith, 2001). These populations were not recruited due to their expertise in either environmentalism or feminism. Hence, I suggest that the responses of my participants to the AWS scale are more similar to the responses found in studies using populations drawn randomly from the population or from college students. It is the NEP scale responses in my study that are the anomaly, due, as mentioned previously, to the special expertise that my participants have with a specific environmental issue.

Further research in this area might investigate whether the same phenomenon occurs when individuals with direct experience in a feminist issue are surveyed. Do they rely on general knowledge to answer NEP scale questions

and their own expertise to answer AWS scale questions? Targeting higher numbers of participants would also be worthwhile, and will be discussed later in a section concerning limitations of this study.

Survey data

Further evidence that environmentalists are considering environmentalist issues differently from feminist issues is found in the survey data. There was a significant difference among the mean ratings of the four grizzly bear scenarios. The highest mean of the ratings was the low uncertainty/high expertise scenario. In contrast, there was not a significant difference among the mean ratings of the four tamoxifen scenarios. There was also a difference in the participants' choice of the most convincing scenario in the grizzly question but not in the tamoxifen question. Participants were significantly more likely to choose one scenario over the others. Indeed, 77 percent chose the low uncertainty/high expertise scenario. This was not true in the tamoxifen question as participants were equally likely to choose any one of the four evidence choices. This difference suggests that participants were treating the grizzly scenario questions differently than the tamoxifen scenario questions.

The significant results of the ratings and scenario choice questions suggest that only certain evidence from an individual they consider an expert in the field will convince participants to act with precaution. Given their own expertise on

the issue, it makes sense that experts will view only the evidence of other experts equal to their own opinions. These individuals have made up their minds about this issue and will only be convinced by an authority with highly certain evidence.

On the other hand, there was no statistical difference among scenario ratings or choices of scenario for the tamoxifen scenario. In this case, participants were as likely to choose any of the four variable conditions. I suggest that participants are relying on different kinds of evidence from different sources in the tamoxifen question when they choose which evidence they consider most convincing of precautionary behaviour. These different sources include personal experience, scientific research, experts in the field and women's health organizations. Given that individuals within the group relied on different evidence to make decisions, the choices of evidentiary requirements was randomly distributed across the group. This was, indeed, demonstrated with the tamoxifen scenario, as there was not a statistical difference between scenario choices.

Another interpretation of this difference is that we value personal choice and recognize that we make decisions concerning our well being based often on our experiences. However, we do not want to believe that government decisions are made based on those same criteria. Hence, we want control of personal

health decisions and the benefits of drawing on any type of evidence we find valuable; we want decisions affecting society as a whole to be made using rigorous, scientifically valid data collected by experts in their field. In this case, then, personal experience and choice is an important heuristic to use in decision-making in areas of non-expertise.

It would be interesting to ascertain if a gender difference in responses occurred if the tamoxifen scenario was altered. Given the incorrect assumption that breast cancer only occurs in women, one male participant suggested that it was not an issue he would ever have to worry about. I am curious to find out if the responses are different if the scenario concerns something male-identified, like testicular cancer rather than breast cancer. Additionally, the role of risk in decision-making, in particular personal health risks, would be interesting to investigate; however, this goes beyond the scope of my research. Further empirical research using both participants with expertise in an area and those without for comparison points on evidentiary requirements for precautionary behaviour would be worthwhile.

Individuals also demonstrated differences in their choice of which government cutback is most detrimental to society. Given that participants were recruited due to their expertise with an environmentalist issue, it was surprising to me that there was a significant difference in responses to the final question in

the study, whether government cutbacks to wildlife officers or to women's centres or both were most detrimental to society. Only nine participants selected cutbacks to wildlife officers as most detrimental to society. Twenty-five selected cutbacks to women's centres as most detrimental.

One explanation for this finding may be due to media coverage of the Liberal government's cutbacks. Some of this has focussed on the impact to women's centres. I think, in addition, that the link between cutting hospital funding and other social welfare programmes would be more readily made to cutting funding to women's centres in the minds of participants and may have influenced this question given the publicity that protest marches were given.

Further, most publicity concerning the grizzly hunt relates to the population data and presents the argument concerning population data between the Ministry of Water, Land and Air Protection and Raincoast Conservation Society or Sierra Club. The effectiveness of the members of the Ministry to perform their jobs or for population data to be collected under funding constraints is not dealt with as frequently in the media, if at all.

Another explanation may be due to the value that participants place on the environment and humans. Although they fall within an environmentalist paradigm, when forced to make a choice, participants may still value human life above the environment. Support for this explanation comes from the survey

responses. I had expected to find individuals commenting on the intrinsic value of the grizzly bears as a reason for hunting to end. Instead, I found different statements of extrinsic value. One way of thinking about intrinsic value is as the worth that all things have just by being alive. Extrinsic worth, on the other hand, is a value given by another.

For example, individuals commented that trophy hunting was morally wrong or that they were concerned that the grizzly hunt was a sport hunt, rather than for food. They appear to be saying, then, that the cost/benefit of a bear being used as a trophy was not as convincing as if the bear were being used for food. Discussion of the use of the bear was grounded in extrinsic value. Some participants in this study drew on the destruction of environmental capital through the destruction of the grizzly bears and their habitat for economic reasons. Others drew on the use of environmental interest, using the bears and their habitat for ecotourist opportunities to generate money and support to protect and monitor the bears. Although these are both extrinsic value statements, the one drawing on interest rather than capital is more indicative of an NEP standpoint than a DSP one. Intrinsic statements would demonstrate the value of the bear for its own worth, rather than in any relation or benefit to humans. I suspect that this sort of mindset is difficult for most humans, myself included, to conceptualise given our preoccupation with the human world.

Precaution and role of evidence

I chose to focus on the grizzly hunt controversy in British Columbia because I could not understand how the government could continue to act without precaution when the risk to the grizzly bears through continued hunting was so great. One of the strengths of this research is in its exploratory investigation of the precautionary principle and the role of evidence. I have found that individuals use different types of evidence to invoke precautionary behaviour depending on their expertise with an issue. This finding is important to consider when evaluating the strengths and weaknesses of the precautionary principle as a tool for environmental protection. Given the controversy surrounding the definitions and applications of the precautionary principle, it is valuable to understand how individuals view evidentiary requirements to invoke the principle.

The precautionary principle

There are few points of consensus concerning the precautionary principle. Perhaps the primary reason for this is its lack of solid definition. O'Riordan and Cameron (1994, p. 17-18) describe six concepts that all definitions of the precautionary principle contain. These are; (1) preventative anticipation, (2) safeguarding of ecological space, (3) proportionality of response or cost-effectiveness of margins of error, (4) duty of care or onus of proof on those who

propose change, (5) promoting the cause of intrinsic natural rights, and (6) paying for past ecological debt. Given these principles, it is apparent that the precautionary principle comes out of the New Environmental Paradigm. Over 19 versions of the precautionary principle have been formulated, including Article 15 of the 1992 Rio Declaration and the Wingspread statement (Lofstedt, 2002).

The Wingspread statement was drafted during a conference in 1998 by scientists from universities and environmental organisations. The statement reads, in part: "Where an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically" (*http://www.gdrc.org/u-gov/precaution-3.html*). This statement represents perhaps the strongest wording of the precautionary principle, that protection of the environment is more important than economic gains and even threat of harm is sufficient for an activity to cease or another, more environmentally sound activity to replace it. In contrast, the Canadian government developed a version of the precautionary principle, which, I suggest, relies more heavily on scientific evidence to provide notice of potential risks and the inclusion of cost-effectiveness of precautionary behaviour with a goal of benefits for society, efficiency and the importance of trade (Government of Canada, 2001). In essence, the principle as articulated by

the Canadian government had been made "business friendly" and weakened as a tool for protection of the environment.

Paradigms and precaution

The precautionary principle is a weak tool for environmental protection because it is so malleable, as demonstrated above by the differing definitions. At the crux of this malleability is the evaluation of what is at risk (O'Riordan and Cameron, 1994; O'Riordan, 1995; Cohen, 2001; Conko, 2002). It appears, for the NDP government, the risk of extirpation of the grizzly bear was the pivotal factor in their decision to invoke a ban on hunting. For the current Liberal government, it seems, the risk to individual wealth and business opportunities is the core risk at stake in the banning of the bear hunt. If British Columbia is, indeed, open for business, as Premier Gordon Campbell claims (*http://www.gov.bc.ca/prem/down /premiers_speeches/asia_pacific_found.pdf*), then a precautionary principle that is supportive of business and trade will be more politically palatable than one focussed on environmental protection. Using the same information, the NDP and Liberal governments came to different conclusions concerning the bear hunt in British Columbia, based, I argue, on their different conceptualization of what is at risk.

Similarly, participants in this study took the information provided in the scenarios and came to different conclusions about what this evidence indicated

and the value of the evidence. Given that the precautionary principle will be invoked in the face of scientific uncertainty, the knowledge that individuals located within both environmentalist and feminist paradigms used the same evidence to come to different conclusions is important. I suggest that individuals evaluated evidence from their expertise and personal experiences. Thus, although located within the environmentalist and feminist paradigms, some individuals were more firmly fixed in the paradigm than others. This variability within the paradigm is also contextual; one may act well within the NEP principles in one area and well within the DSP principles in another. Further, as discussed in the example concerning the Liberals viewing the grizzly hunt moratorium as a risk to business and the NDP viewing the grizzly hunt as a risk to the environment, another factor influencing how individuals view evidence and precautionary behaviour is in how they define what is at risk.

For example, although all three groups agreed that low uncertainty evidence from a high expertise source was most convincing of the need for precautionary behaviour, 92 percent of hunters did not make a precautionary decision at the outset. In contrast, 100 percent of activists did. I would suggest that this finding relates to the concept of what each group would view is at risk by hunting. Hunters may view their hunting activities as an important part of conservation activities. In weeding out the populations and assuring that there is

no overpopulation, they believe they are caring for the overall health of the grizzly bear as a species. What is at risk, then, by not hunting is the health of the grizzly bear. Perhaps then, to them, a risky stance would be to not hunt.

If, as was more evident in the tamoxifen scenarios than the grizzly scenarios, individuals used a variety of evidence to make decisions when faced with scientific uncertainty, then the evidence being used to invoke the precautionary principle when individuals are less familiar with an issue is more varied than scientific evidence alone. Given this finding, alternatives to scientific knowledge such as local knowledges and personal experiences are important to consider when looking at what evidence is necessary to invoke the precautionary principle. The role of local knowledge in knowledge claims and as evidence for precautionary behaviour is outside the scope of this research but would be worthwhile to pursue in relation to the precautionary principle, particularly in issues where local and scientific knowledge are in conflict.

Contextual values

I was surprised by the identification of the grizzly bear population data as a societal or personal issue rather than a conservation or management issue by many of the bear biologists. For example, participant S005 wrote, "Bears can support a harvest but this is a societal issue not a conservation or wildlife management one in B.C.". My interpretation is that the individual who wrote

this statement was suggesting that to trophy hunt or not is a personal value decision and can be effectively addressed on that level. Further, this statement suggested that this value decision overrides what evidence is found, what numbers are estimated or how good the methods might be. This echoes Longino's (1990) claim that society determines what is considered scientific knowledge. These are contextual values, looking at the intersection of personal, social and cultural values (Longino, 1990). Hence, where an individual stands on the grizzly hunt will influence her/his evaluation of the grizzly population data and, by extension, opinion concerning whether to hunt or not.

It was interesting that the hunters and activists in this study acted as well-delineated groups in some of their responses. The above responses concerned with the initial decision to hunt or not are one such example. The scientists, however, did not display the same homogeneity of responses. Given the criterion for inclusion in this subgroup, post graduate work in an academic discipline related to the environment, I expected this group to show more similarity, particularly given their training to become scientists.

Longino's (1990) discussion of contextual values may play a role in explaining why there was not more homogeneity in the subgroup of scientists. Although participants in the subgroup of scientists were trained as scientists in the process of doing science, they did not respond similarly to the scientific

evidence presented in the scenarios. One would assume that scientists would look at data similarly, given the role of constitutive values to endorse "good" science in their training. This group of any should look at data similarly, drawing on constitutive values to delineate what they know for certain. However, I found that this was not the case. Scientists acted least like a group.

Longino (1990) suggests that data will only be taken as evidence of a phenomenon in light of background beliefs concerning the association between the perceived cause and effect. In this case, then, the population data of the grizzly bears was taken as both evidence to stop the hunt and evidence to continue the hunt. According to Longino's evaluation of contextual values, this would be possible given that scientists were drawing on background beliefs to make decisions about the evidence presented.

It appears that contextual beliefs are a mediating influence on the scientists in this study in their evaluation of the scientific evidence concerning the grizzly population data. Some scientists are also hunters and evaluate the evidence from that standpoint. Some scientists are also activists and evaluate the evidence from that standpoint. Thus, these values inform how the evidence is interpreted and how the same data can support two vastly different responses as in the grizzly hunt controversy in British Columbia in 2001.

Statements relating to personal choice and moral decision-making lend additional weight to my finding, that what evidence individuals find most convincing of precautionary behaviour differs according to the context. For some, personal value decisions were given the most weight as reasons to be precautionary, *e.g.*, statements such as "trophy hunting is morally wrong". For others, the objectivity of the scientific evidence was more convincing of precautionary behaviour. Although statements of the precautionary principle like the Wingspread statement suggest that the threat of harm is enough for the precautionary principle to be invoked, the weight of scientific data is recognized in the articulation of the principle by the Canadian government.

The evidence from this research underlines the use of scientific evidence. Participants chose scientific evidence from a scientist over any other type of data as the most convincing of precautionary behaviour when they were well informed about the topic. They relied on a range of decision-making techniques when determining which evidence was most convincing of precautionary behaviour on a topic where they lacked expertise. Although we recognize the lack of objectivity, the fallibility, the influence of personal beliefs on science, we also recognize that scientific data are a valuable source of information.

This research brought the role of scientific evidence home to me in a different way. On the surface, this suggests that we rely on our own expertise

and scientific evidence when we are knowledgeable about a topic and that we rely on personal experience and a range of other options when we are unfamiliar with a topic. I argue, however, that it goes deeper than that. When we know enough about a topic to fully understand the scientific evidence and the methodology, we are more likely to trust the scientific data and the scientists. When we are less able to evaluate the scientific evidence competently we rely on other sources of evidence.

Individuals' reasoning for precautionary behaviour is complex and contextual. The precautionary principle is not easily defined nor easily applied for these very reasons. These are intricate issues resting on individuals' values and the community that shares a set of assumptions, concepts, values and practices to organize its reality. The paradigms that people endorse will be different in different contexts, as will their evaluation of what is at risk. It is critical to understand this complexity when evaluating what constitutes threat of harms and risk. The results of this research add to this complexity, demonstrating empirically that the same individuals in different contexts will invoke different paradigms and find different evidence convincing.

Strengths and limitations of the study

The greatest strength of this study is the use of participants drawn from a population that does not consist of university students. The input from my

participants was invaluable, both of itself and for its role in shifting my view about issues relevant to the precautionary principle. The issues raised herein are those identified as important to those affected by the controversy over the grizzly population data.

One limitation of this research is the low number of participants. Data collection was difficult as the participants I approached often met me with suspicion. Throughout the study, I faced questions concerning whom I was working for, who was funding the study and who was funding my supervisor. Interestingly, the suspicion came from all groups – hunters, scientists and activists – rather than just one. Indeed, the concerns raised by each group were similar. I found this, in some ways, heartening as it demonstrated that my own feelings about the issues were not coming through to the participants and biasing their responses. Individuals who voiced their concerns regarding my personal biases and opinion about hunting referred to their fears that I would portray them as stereotypes, for example, uneducated, barbaric hunters, uncaring, government-influenced biologists or emotional, simplistic activists. They were also concerned that I was working for one of the other groups, thus, hunters thought I was an environmentalist; environmentalists thought I was working for the government; government employees thought I was working for environmental groups.

Further to this issue is that of non-respondents. I approached 128 individuals and only 48 returned completed questionnaires. This may mean that my results are an artefact of a restricted range. I may not have low scores on the NEP and AWS scales because those individuals who would have fallen in these ranges chose not to participate in this study.

A second limitation of the study lies in the survey instrument. Participants responded with high scores on both scales, indicating positive attitudes toward women and the environment. There may have been issues with participants scoring positively due to social desirability issues. Indeed, the fact that I am a Women's Studies graduate student may well have affected responses on the AWS scale and perhaps also the NEP scale. Personal issues of the participants on the NEP scale may have affected scores as well. For example, not wanting the group they belong to appear to disregard the importance of the environment, given that all groups argue publicly that they are integral in protecting it.

In many cases, I found that my participants wrote additional comments about the question or their answers in the margins of the NEP and AWS scales. One participant called me at home with a concern about the use of the NEP scale and her/his belief that it is biased against environmentalists. The lack of correlation between the two scales in my study may have been influenced by

participants' suspicions about the ultimate use of the results. Moreover, the desire to voice their opinions about the issue rather than choosing whether they agree or disagree with isolated statements about women and the environment may have been a factor in the lack of support for a relationship between the attitudes. Participants may have been interested in the open-ended questions and contributed valuable answers on those questions as it was more apparent what the relevance of these questions were to them. Therefore, as the purpose behind the scales was not readily apparent, participants may have been more hesitant in their answers. I think that this explanation is most likely given the volume of information my participants provided on the open-ended questions and the qualifications they placed on their survey answers.

The comments in the margin and in space provided at the end of the survey generated by the scales were surprising to me. I am uncertain whether this indicates that my participants were uncomfortable being forced to quantify their beliefs or if it was a dislike of the wording of questions within the scales. In retrospect, I think that some of the questions on the scales were misleading or ambiguous and can understand why my participants who were likely unused to filling out psychological surveys would be disgruntled by being asked to score how much they agreed/disagreed with "It is ridiculous for women to darn socks and men to run locomotives." One participant wrote, "Why not buy new socks?"

These sorts of responses indicated that the issue was with the scales themselves, rather than having to quantify a response.

Another limitation of the survey instrument lies in the questions that I designed. On reflection, the four scenario questions that were presented for the grizzly population data and tamoxifen could have been clearer. The challenge of further research on this area will be to design a study in which the categories of uncertainty are mutually exclusive and less ambiguous. For example, my intention was that the tamoxifen scenario in which the doctor recommended two different studies to the patient would be seen as high uncertainty/high expertise source. However, some participants lauded this doctor for providing her patient with more information about her health and her choices and empowering her with knowledge. Only one participant commented that the presentation of contradictory studies would confuse her/him. Running a pilot study to be certain that the way the researcher intended the scenarios to read was in fact how they were being read would have been worthwhile for this project.

Personal reflections

My view of what it means to be an environmentalist has grown due to my experiences with this thesis. The stereotypes of "hunters", "scientists" and "activists" were not present among my participants. Instead I found 48 well-informed individuals with real concern over the hunting of bears and open to

solutions. From the many conversations I have had during this research, I think that the government biologists are doing the best they can under the current Liberal regime. I am convinced that the government biologists are using the best available methods and have the best estimate of the grizzly bear population, given the funding restrictions they are working under. Whether the grizzly hunt is sustainable or morally defensible is another issue.

Although only touched on in this work, my larger conceptualisation of the precautionary principle and how humans relate to and treat the environment is concerned with moral responsibility. As such, my primary interest is how people think about what "being cautious" means when it relates to the environment and at what cost we will act with caution. Further, for all that the image of my uncle, my cousin and I hanging a moose carcass over a rack in my uncle's shop will forever be etched in my mind, I wonder if any of the hunters laid their hands on the moose's head and apologized to him, as I did. At what cost to the moose and to the environment is my closer relationship to my uncle and cousin and theirs with their friends being bought? And is it worth it?

As a personal choice, I do not believe that human progress at the expense of other animals is morally viable. In September 2003, I start my PhD at Ohio State University working with 11 chimpanzees, many of whom have been rescued from circuses or biomedical facilities. Researchers in the lab are

investigating the boundaries of chimp thought. Thus far, most of the chimps can count from zero to seven, spell three letter words and match pictures of other chimps with their written names. My personal goal in this is to bring awareness of the complexity and depth of chimpanzee mindfulness in an effort to save our closest genetic relatives in the wild and in captivity. I think that humans will only understand the importance of protecting other great apes when they fully recognize how similar the five great ape species are. Presenting research on the complexity of chimp minds to demonstrate the connectedness of great apes is my way of doing my part for the other great apes. Given our selfish natures, I think that the only way humans will begin to really work for environmental change is when we first recognize that our lives depend on it and then see how closely related all living things are. If this recognition starts with other great apes, whose close relationship to humanity is more readily apparent, at least we have a beginning.

Although my journey through this research began with Kakinga, a koan that features prominently in a book by Daniel Quinn (1995), entitled *Ishmael*, prodded my moral beliefs about animal rights and environmental protection. This book is about a telepathic gorilla named Ishmael who is trying to save the world by teaching a few humans to live better and then to teach others. In it, Ishmael asks, "With man [sic] gone, will there be hope for gorilla?" Ishmael,

through this koan, proposes two paradoxical ideas; the first, that perhaps the world will only have hope for survival when humans are gone, the second, that without humans, perhaps the natural world has no hope. Humanity must choose either to act with caution and care toward the environment, locating ourselves within the New Environmental Paradigm or to continue to measure success and progress by personal wealth and technological advances, ensconced firmly in the Dominant Social Paradigm. The choice is ours.

Appendix A Ethics Approval

APPENDIX A*

SIMON FRASER UNIVERSITY

OFFICE OF RESEARCH ETHICS

BURNABY, BRITISH COLUMBIA
CANADA V5A 1S6
Telephone: 604-291-4377
FAX: 604-268-6789

April 16, 2003

Ms. Megan Bulloch
Graduate Student
Women's Studies
Simon Fraser University

Dear Ms. Bulloch,

Re: The precautionary principle: Attitudes Toward Women and the Environment in Relation to Scientific uncertainty and decision-making

The above-titled ethics application has been granted approval by the Simon Fraser Research Ethics Board, at its meeting on February 17, 2003 in accordance with Policy R 20.01, "Ethics Review of Research Involving Human Subjects".

Sincerely,

Dr. Hal Weinberg, Director
Office of Research Ethics

/jmy

* For inclusion in thesis/dissertation/extended essays/research project report, as submitted to the university library in fulfillment of final requirements for graduation. Note: correct page number required.

Appendix B Questionnaire

SURVEY:
ATTITUDES TOWARD DECISION MAKING

Please read the scenario below carefully and answer the following questions.

Biologists working for the B.C. Government estimate the grizzly bear population to be between 10, 000 and 13,000 bears. They have used one of many methods available to estimate animal populations. On the basis of this information, the Ministry of Water, Land and Air Protection has allowed Limited Entry Hunting (a fixed number of hunting licenses that are distributed by lottery). The number of hunting licenses is determined as a percentage of the population estimates. For example, 3% of the total population is 300 to 390 bears so in a population of 10,000 to 13,000 bears, licenses would be issued for hunting 300 to 390 bears.

Based on the information above, would you support the government's decision to allow Limited Entry Hunting?

YES NO

What factors were important in making your decision?

Please indicate how convinced you are by the information provided in the following scenarios.

Not at all convinced	Slightly convinced	Somewhat convinced	Strongly convinced	Absolutely convinced
1	2	3	4	5

A. An individual who lives in an area that has a high grizzly population appears on the local news, saying that there haven't been any grizzlies seen in the area for 3 years and that local residents are concerned about the health of the grizzly population. This person is worried that the bears have been over-hunted at a time when the populations face other challenges.

1 2 3 4 5

B. A well-known and respected bear biologist reports that the method the scientists used to determine the B.C. population is flawed and that it over-estimates the bear population. However, the biologist does not know how much the method over-estimates the population. It could be by as much as 5,000 bears, or as little as 500 bears. This means that the population could be as low as 5,000 or as high as 12,500 bears. The biologist is concerned that if the government allows hunting of 300 to 390 bears per year, there will be no bears in ten years.

1 2 3 4 5

C. An environmental group that is known for being against the grizzly hunt reports that the government has overestimated the populations of bears. They think this is so on the basis of anecdotal evidence from local residents. The environmental group demands that bear hunting be discontinued indefinitely.

1 2 3 4 5

D. The bear biologist who initially placed the population at 13,000 bears issues another report. This report is done using a better, more accurate method than the first population count. It finds that there are 4,000 to 6,000 grizzly bears. This biologist is concerned about the sustainability of the population and wants to use this population data to determine the number of bear hunting licenses issued. This drops the number of licenses to 160 from 300 to 390 per year.

1 2 3 4 5

Please circle which scenario provides the best evidence *against* the bear hunt and your reasons why in the space provided.

A B C D

Please explain what evidence you took into consideration when making your decision.

Please read this scenario and answer the questions in bold at the bottom.

A study of 13 thousand Canadian and American women is done on the drug tamoxifen, which is used as a treatment for breast cancer. The purpose of this study is to test the ability of the drug to prevent breast cancer in women who are at high risk of developing breast cancer. The study finds that tamoxifen lowers the risk of breast cancer when taken by women who do not have breast cancer but who are in a high risk category. Tamoxifen is approved in Canada for use in the treatment of breast cancer. Although Health Canada has not approved the use of tamoxifen for *prevention* of breast cancer, your physician can prescribe it to you at her or his own discretion to prevent breast cancer.

Based on the information above, would you support the use of this medication for the prevention of breast cancer?

YES NO

What factors were important in making your decision?

Please indicate how convinced you are by the following scenarios.

Not at all convinced	Slightly convinced	Somewhat convinced	Strongly convinced	Absolutely convinced
1	2	3	4	5

A. Health Canada does not approve the use of tamoxifen as a preventative treatment for breast cancer. Instead, it issues a warning to doctors not to prescribe tamoxifen as a preventative treatment due to the increased risks for reproductive cancers in subsequent studies.

1 2 3 4 5

B. A Women's health organization reports that numerous otherwise healthy women have had serious side effects when taking tamoxifen as a preventative treatment. They do not have scientific evidence to support this but they do have anecdotal evidence in the complaints of many women in Canada.

1 2 3 4 5

C. The individual's doctor gives her more information about the drug and possible complications. This information states that there have been no long-term studies done to assess the possible dangers associated with tamoxifen. One study suggests the tamoxifen will decrease risk of breast cancer by up to 50 percent. Other research demonstrates the drug will increase risk of blood clots, referring to three women who died of blood clots in their lungs during the drug testing trials.

1 2 3 4 5

D. An individual whose mother and sister both died of breast cancer begins taking tamoxifen to prevent breast cancer. Within two years, she is diagnosed with endometrial cancer (cancer of the lining of the uterus). She and her doctor research the association of tamoxifen with endometrial cancer and are convinced that this is what caused her cancer.

1 2 3 4 5

Please circle which scenario provides the best evidence *against* the use of this drug and your reasons why in the space provided.

A B C D

What evidence did you consider in making your decision?

Please rate these two governmental cutbacks on the following scale.

Not at all Agree	Slightly Agree	Somewhat Agree	Strongly Agree	Absolutely Agree
1	2	3	4	5

A. Laying off wildlife officers who patrol poaching, licensing and do research on the health of populations of animals in B.C. has a negative effect on society overall.

1 2 3 4 5

B. Cutting funding to women's centres and shelters which provide information, safe havens and counselling for women who are in dangerous situations in B.C. has a negative effect on society overall.

1 2 3 4 5

In rating the above scenarios, choose which of the two is the most detrimental for society, in your opinion.

A or B or C (equally detrimental)

Please indicate your opinion about the following statements about attitudes toward the environment.

Strongly Disagree	Mildly Disagree	Unsure	Mildly Agree	Strongly Agree
1	2	3	4	5

We are approaching the limit of the number of people the earth can support.

1 2 3 4 5

Humans have the right to modify the natural environment to suit their needs.

1 2 3 4 5

When humans interfere with nature it often produces disastrous consequences.

1 2 3 4 5

Human ingenuity will insure that we do NOT make the earth unliveable.

1 2 3 4 5

Humans are severely abusing the environment.

1 2 3 4 5

The earth has plenty of natural resources if we just learn how to develop them.

1 2 3 4 5

Plants and animals have as much right as humans to exist.

1 2 3 4 5

The balance of nature is strong enough to cope with the impacts of modern industrial nations.

1 2 3 4 5

Despite our special abilities, humans are still subject to the laws of nature.

1 2 3 4 5

The so-called "ecological crisis" facing humankind has been greatly exaggerated.

1 2 3 4 5

Strongly Disagree	Mildly Disagree	Unsure	Mildly Agree	Strongly Agree
1	2	3	4	5

The earth is like a spaceship with very limited room and resources.

1 2 3 4 5

Humans were meant to rule over the rest of nature.

1 2 3 4 5

The balance of nature is very delicate and easily upset.

1 2 3 4 5

Humans will eventually learn enough about how nature works to be able to control it.

1 2 3 4 5

If things continue on their present course, we will soon experience a major ecological catastrophe

1 2 3 4 5

Please indicate your degree of agreement or disagreement with the following statements about equality and attitudes toward women.

Strongly Disagree	Mildly Disagree	Unsure	Mildly Agree	Strongly Agree
1	2	3	4	5

Swearing and obscenity are more repulsive in the speech of a woman than a man.

1 2 3 4 5

Under modern economic conditions, with women active outside the home, men should share in household tasks such as washing dishes and doing laundry.

1 2 3 4 5

It is insulting to women to have the "obey" clause still in the marriage services.

1 2 3 4 5

A woman should be as free as a man to propose marriage.

1 2 3 4 5

Women should worry less about their rights and more about becoming good wives and mothers.

1 2 3 4 5

Women earning as much as their dates should bear equally the expense when they go out together.

1 2 3 4 5

Women should assume their rightful place in business and all the professions along with men.

1 2 3 4 5

A woman should not expect to go to exactly the same places or to have quite the same freedom of action as a man.

1 2 3 4 5

Sons in a family should be given more encouragement to go to college than daughters.

1 2 3 4 5

Strongly Disagree	Mildly Disagree	Unsure	Mildly Agree	Strongly Agree
1	2	3	4	5

It is ridiculous for a woman to run a locomotive and for a man to darn socks.

1 2 3 4 5

In general, the father should have greater authority than the mother in the bringing up of children.

1 2 3 4 5

The intellectual leadership of a community should be largely in the hands of men.

1 2 3 4 5

Economic and social freedom is worth far more to women than acceptance of the ideal of femininity, which has been set up by men.

1 2 3 4 5

There are many jobs in which men should be given preference over women in being hired or promoted.

1 2 3 4 5

Women should be given equal opportunity with men for apprenticeship in the various trades.

1 2 3 4 5

Age:_____

Sex: Male Female

How would you describe your ethnicity?_____

Highest educational level completed:

____Elementary School
____Some High School
____High School Diploma
____Some College or University
____University Degree
____Some Technical or Trade School
____Technical Diploma or Trade Certificate
____Some Graduate Work
____University Graduate Degree

Area of education: _____

Annual Income:

____$0-10,000
____$10,001 -$20,000
____$20,001-$30,000
____$30,001-$40,000
____$40,001-$50,000
____$50,001-$60,000
____$60,001-$70,000
____$70,001-$80,000
____$80,001-$90,000
____ Above $90,000

Do you frequently attend a house of worship?_____

How would you describe your political stance?

Left	Liberal	Conservative	Other?

Other? Please explain: _____

Do you have a political-party affiliation? If so, which one?_____

Current Residential environment (i.e., where you live now):
Rural (e.g. Hope) Semi-rural (e.g. Abbotsford) Urban (e.g. Vancouver)

Original Residential environment (i.e., where you grew up):

Rural Semi-rural Urban

What sort, if any, of volunteer work do you do? Check all that apply.

___Volunteer your time for a cause
___Write letters to papers and government officials
___Give donations to organisations
___Tell others about issues
___Demonstrate outside government or other offices
___Set up an information booth
___None of the above
___Other? Please explain._____

Please check all of the sources of information that you use for health and environmental issues. Please rank them with (1) being the one you trust the most and (5) the source you trust the least.

___Newspaper
___Television
___Radio
___Internet
___Listserv
___Lecture
___Academic journal
___Environmental or health group newsletters
___Professionals (i.e., university professors, doctors)
___People involved in the issue (i.e., activists)
___Other? Please explain. _____

Please feel free to add any additional comments about the study or your thoughts about the questions. Thank you again for participating in this survey.

Appendix C Initial Email

Hello [Name]:

I am investigating how attitudes toward the environment and women interact with scientific decision-making in the face of uncertainty. In the broad scope, this research also falls under an investigation of the Precautionary Principle, as I am focusing on the grizzly bear population data in B.C.

Participation entails filling out a pen and paper survey, which should take approximately 15 to 20 minutes of your time. Your responses will be anonymous and participation will be kept confidential, and this research has passed the SFU Research Ethics Board.

If you are interested in participating, please let me know and I will forward a survey to you by mail. Feel free to contact me by email or phone 604-632-0383 if you have any questions at all.

Appendix D Cover letter

Dear [Name of participant]:

Thank you for agreeing to participate in my study. I have enclosed the information document, survey and return envelope. Please read the information document as it outlines what will be required of you and your informed consent.

Please complete the survey and return in the envelope provided by 15 May 2003. I have enclosed a blank envelope if you wish to be provided with the results of my study. Please address it to yourself and return with your survey. These will be kept separately from the surveys.

This study has passed review by the Ethics Board at Simon Fraser University. Your rights as a participant can be found in the information document. I want to stress that I am interested in your opinions -- there are no right or wrong answers. As well, please remember that you are not required to answer all of the questions and may withdraw from the study at any time.

If you have any questions, please feel free to contact me at mbulloch@sfu.ca or 604-632-0383. In addition, if, after completing the survey, you have suggestions of other individuals who might be interested, please feel free to pass my contact information on to them.

Thank you,
Megan J Bulloch

Appendix E Information Document

Information document

Thank you for agreeing to complete this survey on attitudes about scientific decision-making. There are no right or wrong answers to this survey. I am interested in your opinions. If you are interested in finding out more about my research, I would be happy to answer any questions you might have. Please read the following carefully as it outlines what you will be doing as a participant in the study and what your informed consent means. Your completion of this questionnaire is taken as your consent to participate in this study.

As a participant in this study, you will be asked to fill out questions about your attitudes about scientific decision-making. This will take approximately 15 minutes. The bulk of these questions come from previous psychology research. Strict confidentiality and privacy will be maintained. Your identity will never be associated with your answers. There is no risk to your psychological or physical health in this study. You are free to withdraw from the study at any time or to refrain from answering any question.

If you are interested in the final results from these surveys, please address the envelope provided to yourself and I will send you a summary of these results. These envelopes will be kept separately from the questionnaires and will not be associated with them in any way. If at any time you have questions about this research, you can get in touch with me via email at mbulloch@sfu.ca or through the Women's Studies Department, Simon Fraser University, 8888 University Way, Burnaby, B.C., V5A 1S6.

The University and I subscribe to the ethical conduct of research and to the protection at all times of the interest, comfort and safety of subjects. This research is being conducted under permission of the Simon Fraser University Research Ethics Board. The chief concern of the Board is for the health, safety and psychological well being of research participants.

Should you wish to obtain information about your rights as a participant in research, or about the responsibilities of the researcher, or if you have any questions, concerns or complaints about the manner in which you were treated in this study, please contact Dr. M. Kimball, the Chair of Women's studies, by email at kimball@sfu.ca or phone at 604-291-5526 or Dr. H. Weinberg, Director, Office of Research Ethics, by email at hweinber@sfu.ca or phone at 604-268-6593.

Your completion of the questionnaire will signify that you have read the above description of the procedures, possible risks and benefits of this research project and that you have received an adequate opportunity to consider the information describing the project and that you voluntarily agree to participate in the project or experiment.

Any information that is obtained during this study will be kept confidential to the full extent permitted by the law. Knowledge of your identity is not required. You will not be required to write your name or any other identifying information on research materials. Materials will be maintained in a secure location and destroyed at the completion of the study.

Appendix F Information Document for Ministry Employees

Information document

Thank you for agreeing to complete this survey on attitudes about scientific decision-making. There are no right or wrong answers to this survey. I am interested in your opinions. If you are interested in finding out more about my research, I would be happy to answer any questions you might have. Please read the following carefully as it outlines what you will be doing as a participant in the study and what your informed consent means.

Your completion of this questionnaire is taken as your consent to participate in this study. I do not have official Ministry approval for this study. I am seeking your participation in my research as an individual and not as a representative of the Ministry. Your responses will be anonymous and participation will be kept confidential.

As a participant in this study, you will be asked to fill out questions about your attitudes about scientific decision-making. This will take approximately 15 minutes. The bulk of these questions come from previous psychology research. Strict confidentiality and privacy will be maintained. Your identity will never be associated with your answers. There is no risk to your psychological or physical health in this study. You are free to withdraw from the study at any time or to refrain from answering any question.

If you are interested in the final results from these surveys, please address the envelope provided to yourself and I will send you a summary of these results. These envelopes will be kept separately from the questionnaires and will not be associated with them in any way. If at any time you have questions about this research, you can get in touch with me via email at mbulloch@sfu.ca or through the Women's Studies Department, Simon Fraser University, 8888 University Way, Burnaby, B.C., V5A 1S6.

The University and I subscribe to the ethical conduct of research and to the protection at all times of the interest, comfort and safety of subjects. This research is being conducted under permission of the Simon Fraser University Research Ethics Board. The chief concern of the Board is for the health, safety and psychological well being of research participants.

Should you wish to obtain information about your rights as a participant in research, or about the responsibilities of the researcher, or if you have any questions, concerns or complaints about the manner in which you were treated in this study, please contact Dr. M. Kimball, the Chair of Women's studies, by email at kimball@sfu.ca or phone at 604-291-5526 or Dr. H. Weinberg, Director, Office of Research Ethics, by email at hweinber@sfu.ca or phone at 604-268-6593.

Your completion of the questionnaire will signify that you have read the above description of the procedures, possible risks and benefits of this research project and that you have received an

adequate opportunity to consider the information describing the project and that you voluntarily agree to participate in the project or experiment.

Any information that is obtained during this study will be kept confidential to the full extent permitted by the law. Knowledge of your identity is not required. You will not be required to write your name or any other identifying information on research materials. Materials will be maintained in a secure location and destroyed at the completion of the study.

Appendix G The grizzly hunt in British Columbia

The NDP government in British Columbia called a moratorium on the grizzly bear hunt in February 2001. There would be no hunting of grizzly bears in British Columbia until a full population census was performed to determine if hunting was an environmentally sustainable action. This appeared to be an example of a situation where the protection of wildlife was being placed above the desires of small special interest group.

Unfortunately, in July 2001, shortly after their election in May, the Liberal government in British Columbia reinstated the grizzly bear hunt, replacing the blanket moratorium with local moratoriums and hunting areas and convened an independent panel of bear biologists to evaluate grizzly bear management in British Columbia. One would think that legislation governing the hunting of grizzlies would be less important than hospital closures or tuition increases to the general population in the province. However, given the swiftness with which this issue was addressed and overturned, I wondered what was at stake for the Liberal government that they acted so swiftly, moving from a precautionary stance to one that seems decidedly risky for the bear populations.

If the population counts are over-estimating the number of bears – and keeping in mind that hunting permits are a percentage of population totals – then, the hunt would not be sustainable and the populations in danger of

extirpation. Independent biologists, former government biologists and activists criticized the population methodology used by the government biologists. Hunters – particularly the Guide Outfitters Association of British Columbia – spoke out in favour of the government's decision.

An independent scientific panel was convened by the Ministry of Water, Land and Air Protection to submit a review of grizzly bear management in British Columbia. This report was released in March, 2001. They supported the bear management techniques of the British Columbia government and found no reason for the grizzly hunt to be cancelled (Peek et al., 2003). This panel supported a population estimate of 13,800 bears in British Columbia.

Important within any discussion of the grizzly bear hunt is recognition of the status of the grizzly bear populations in the world. Historical populations of bears stretched from present day Alaska to Mexico. These populations were estimated at well over 50,000 bears in the early 1800s. Bears now live in far less than half of their previous North American range, although it is suggested by CITES that they occupy 89% of their historic range in British Columbia. Declines in grizzly bear populations have been attributed to factors such as human caused mortality through hunting, poaching and indirectly through habitat encroachment such as urban spread, logging, mining and recreation use of

wilderness areas (Gibeau et al, 1996; Herrero and Gibeau, 1999; McLellan et al, 1999).

In Canada, grizzly bears are not listed as endangered or threatened. The Committee on the Status of Endangered Wildlife in Canada considers them a species of special concern. The prairie population of grizzly bears is listed as extirpated. In British Columbia, the population is being watched due to the affects of human activities on the populations. The general conclusion in Canada then seems to be that the bear populations are not healthy or approaching historic levels but neither are they considered endangered.

In the United States, grizzly bears are listed as threatened and protected under the U.S. Endangered Species Act.

List of References

Batt, S & the Working Group on Women and Health Protection (2001). Public health vs. Chemoprevention. *Centres of Excellence for Women's Health Research Bulletin, 2(2),* p. 9-12.

BCA. *Pills for "Prevention" vs. the precautionary principle.* (http://www.bcaction.org/Pages/LearnAboutUS/PillsForPrevention.html *accessed January 16th, 2003).*

Buttel, F. (1987). New directions in environmental sociology. *Annual review of sociology 13,* 465-488.

Catton, W. and Dunlap, R. (1978). Environmental sociology: A new paradigm. *The American sociologist 13,* 41-49.

Catton, W. and Dunlap, R. (1980). A new ecological paradigm for post-exuberant sociology. *American behavioural scientist 24(1),* 15-47.

Dunlap, R.E. and Van Liere, K.D. (1978). The "New Environmental Paradigm". *The Journal of Environmental Education 9,* 10-19.

Dunlap, R.E., Van Liere, K.D., Mertig A.G. and Jones, R.E. (2000). Measuring endorsement of the New Ecological Paradigm: A revised NEP Scale. *Journal of Social Issues 56(3),* 425-442.

Fassinger, R.E. (1994). Development and testing of the attitudes toward feminism and the women's movement (FWM) scale. *Psychology of Women Quarterly, 18,* 389-402.

Freudenburg, W. and Gramling, R. (1989). The emergence of environmental sociology: Contributions of Riley E. Dunlap and William R. Catton, Jr.. *Sociological inquiry 59(4),* 439-452.

Gaard, G. (1993) *Ecofeminism: Women, animals, nature.* Philadelphia: Temple University Press.

Gibeau, M., Herrero, S., Kansas, J. & Benn, B. (1996). *Grizzly bear population and habitat status in Banff National Park: A report to the Banff Bow Valley Study Task force by Eastern Slopes Grizzly Bear Project.*

Glick, P. and Fiske, S.T. (1997). Hostile and Benevolent sexism: Measuring ambivalent sexist attitudes toward women. *Psychology of Women Quarterly, 21,* 119-135..

Government of Canada. (2001). *A Canadian Perspective on the Precautionary Principle/Approach.* (http://www.pco-bcp.gc.ca/raoics-srdc/docs/precaution/Discussion/discussion_e.htm *accessed January 8th, 2003*).

Gramling, R. and Freudenburg, W. (1996). Environmental sociology: toward a paradigm for the 21st century. *Sociological spectrum 16,* 347-70.

Grendstad, G. (1999). The new ecological paradigm scale: Examination and scale analysis. *Environmental politics 8(4),* 194-205.

Griffin, S. (1989). Split Culture. In. J. Plant (Ed.), *Healing the wounds: The promise of ecofeminism.* Philadelphia, PA: New Society Press.

Haraway, D. (1989). *Primate Visions: Gender, Race and Nature in the World of Modern Science.* New York, NY: Routledge.

Harding, S. (1986). *The science question in feminism.* Ithaca, NY: Cornell University Press.

Herrero, S. and Gibeau, M. (1999). *Status of the Eastern Slopes Grizzly Bear Project.* Calgary, Alberta: University of Calgary, ESGPB.

Howell, D. (1997). *Statistical methods for psychology* 4th Ed. Toronto: Duxbury Press.

King, L.A. and King, D.W. (1997). Sex-role egalitarianism scale: Development, psychometric properties, and recommendations for future research. *Psychology of Women Quarterly, 21,* 71-87.

Kuhn, T. (1962). *The Structure of Scientific Revolutions.* Chicago, IL: Chicago University Press.

Lalonde, R. and Jackson, E.L. (2002). The New Environmental Paradigm Scale: Has it outlived its usefulness? *The Journal of Environmental Education 33(4),* 28-36.

La Trobe, H.L. and Acott, T.G. (2000). A Modified NEP/DSP Environmental Attitudes Scale. *The Journal of Environmental Education 32(1),* 12 - 20.

Lofstedt, R. (2002). *Introductory paper: The Precautionary Principle: risk, regulation and politics.* (http://www.21stcenturytrust.org/precprin.htm *accessed January 8th, 2003).*

Longino, H.E., (1990). *Science as social knowledge: Values and objectivity in scientific inquiry.* Princeton: Princeton University Press.

Masser, B. and Abrams, D. (1999). Contemporary sexism: The relationships among hostility, benevolence and neosexism. *Psychology of Women Quarterly, 23,* 501-517.

Maxwell, J. (1996). *Qualitative research design: An interactive approach.* Thousand Oaks, CA: Sage.

McHugh, M.C. and Frieze, I.H. (1997). The measurement of gender-role attitudes: A review and commentary. *Psychology of Women Quarterly, 21,* 1-16.

McLellan, B.N., F.W. Hovey, R.D. Mace, J.G. Woods, D.W. Carney, M.L. Gibeau, W.L. Wakkinen, and W.F. Kasworm. (1999). Rates and causes of grizzly bear mortality in the interior mountains of British Columbia, Alberta, Montana, Washington and Idaho. *Journal of Wildlife Management 63,* 911-920.

Mellor, M. (1997). *Feminism and Ecology.* Cambridge, UK: Polity Press.

Merchant, C. (1980). *Death of Nature: Women, ecology and the scientific revolution.* New York: Harper & Row.

Mies, M. and Shiva, V. (1993). *Ecofeminism.* New Delhi, India: Kali for Women.

O'Riordan, T. (1995). The application of the precautionary principle in the United Kingdom. *Environment and Planning A 27(10),* 1534.

O'Riordan, T. and Cameron, J. (1994). *The history and contemporary significances of the precautionary principle. In O'Riordan, T. & Cameron, J. (eds.)* Interpreting the Precautionary Principle. *UK: Earthscan Publications. pp. 12-30.*

O'Riordan, T. and Cameron, J. (1994). *Editorial introduction to section two: The implications of science. In O'Riordan, T. & Cameron, J. (eds.)* Interpreting the Precautionary Principle. *UK: Earthscan Publications. pp. 62-68.*

Oxford English Dictionary 2th ed (19 89). Oxford: Oxford University Press.

Peek, J., Beecham, T., Garshelis, D., Messier, F., Miller, S. and Strickland, D. (2003). *Management of Grizzly bear in B.C.: A review by an independent scientific panel.* Submitted to Ministry of Water, Land and Air Protection, Victoria, B.C.

Quinn, D. (1995). *Ishmael.* Toronto: Bantam Books Canada.

Shelton, J. (2001). *Bear Attack II: Myth and Reality.* Hagensborg, B.C.: Pallister Publishing.

Siegel, S. and Castellan, N.J. (1988). *Nonparametric statistics for the behavioural sciences (2nd Ed.).* San Francisco, CA: McGraw-Hill.

Smith, A.G. & Winter, D.G. (2002). Right-wing authoritarianism, party identification and attitudes toward feminism in student evaluation of the Clinton-Lewinsky story. *Political Psychology 23(2),*.355-383.

Smith, D.C. (2001). Environmentalism, feminism and gender. *Sociological Inquiry 71 (3).* 314-334.

Somma, M. and Tolleson-Rinehart, S. (1997). Tracking the elusive green woman: sex, environmentalism, and feminism in the United States and Europe. *Political Research Quarterly, 50,* 153-169.

Spence, J.T. and Hahn, E.D. (1997). The Attitudes toward Women scale and attitude change in college students. *Psychology of Women Quarterly, 21,* 17-34.

Spence, J.T. and Helmreich, R. (1972). The Attitudes toward Women scale: An objective instrument to measure attitudes toward the rights and roles of women in contemporary society. *JSAS Catalog of Selected Documents in Psychology* 2, 66.

Spence, J.T., Helmreich, R. and Stapp, J. (1973). A short version of the Attitudes toward Women scale. *Bulletin of the Psychonomic Society* 2, 219-220.

Sturgeon, N. (1997). *Ecofeminist natures: Race, gender, feminist theory and political action.* New York, NY: Routledge.

Swim, J.K. and Cohen, L.L. (1997). Overt, covert and subtle sexism: A comparison between the Attitudes toward women and the Modern sexism scales. *Psychology of Women Quarterly, 21,* 103-118.

UNCED (1993). *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, Vol.1, Resolutions Adopted by the Conference, Article 15.* New York, New York :United Nations.

Wang, A.Y. (1999). Gender and nature: A psychological analysis of ecofeminist theory, *Journal of Applied Social Psychology 29(11),* 2410 - 2424.

Warren, K. (1987). Feminism and ecology: Making connections. *Environmental Ethics, 9* 3- 20.

Warren, K. (1990). The power and the promise of ecological feminism. *Environmental Ethics, 12.* p 125 – 146.

Warren, K. (1997). *Ecofeminism.* Indianapolis: Indiana University Press.

Warren, K. (2000). *Ecofeminist philosophy.* New York: Rowman & Littlefield Publishers.